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Vet Prism

Aims and Scope of Journal

"***VET PRISM***" **–** an official publication of JKVDA, a print and open access journal shall encompass scientific knowledge in the field of livestock health and production. It shall publish fully referred articles, review papers, short communications and case reports covering aetio-epidemiological studies, socio-economic implications, laboratory & clinical studies and therapeutic management of animal diseases. Articles containing innovative ideas with practical conceptual interventions would be special attraction of the journal. The journal aims at publishing evidence based field oriented scientific observations in the field of veterinary science. Success stories elucidating and highlighting the multi-faceted role and contribution of veterinarians towards society shall be covered.

VET PRISM accepts papers on a range of different animal species and topics including:

- Livestock health and management.
- Companion animal health
- Poultry and Game birds
- Wildlife species
- Infectious diseases
- Public health and Zoonosis
- Pharmacology and Vaccination
- Livestock economy

VET PRISM shall publish original articles, case reports, review articles and innovative concepts in animal science and research.

The journal operates on a blind review policy.

The detailed guidelines of submission for author's are available on official website of JKVDA www.jkvda.org and all communications may be sent on email editorialjkvda1987@gmail.com.

Vet Prism Journal

The official organ of the Jammu & Kashmir Veterinary Doctors Association (JKVDA)

Office Bearers

Editorial Board

सत्यमेव जयते

Rajeev Rai Bhatnagar

Advisor to Lt. Governor
Jammu & Kashmir

D.O. No. PS/Adv(GB)/584

Dated 27-9-2023.

MESSAGE

I am delighted to share a message for Vet-Prism Journal, a valuable platform for disseminating knowledge and insights in the field of veterinary science and animal husbandry. I understand the pivotal role that veterinary science plays in the overall well-being of our society, including the health of animals and the safety of our food supply.

The pages of Vet-Prism Journal serve as a bridge between research, practice, and policy in the veterinary and animal sciences. This journal brings together experts, researchers, and practitioners to explore new horizons, share discoveries and contribute to the advancement of this vital discipline.

In our fast-evolving world, where the challenges related to animal health, food security, and zoonotic diseases have gained much significance across global, the role of veterinarians and researchers becomes increasingly critical. It is through rigorous research and the exchange of knowledge that we can develop innovative solutions to address these challenges.

I encourage authors to continue submitting their research findings, case studies, and insights to Vet-Prism Journal. Your contributions are not only essential for the scientific community but also for policymakers like myself, as we seek evidence-based solutions to complex issues like one-health including animal & human health.

I also extend my appreciation to the editorial board, reviewers, and all those involved in the publication process for their dedication and commitment to maintaining the highest standards of scholarly publishing.

In conclusion, I wish Vet-Prism Journal continued success in its mission to promote excellence in veterinary and animal sciences. Your work enriches our understanding of these fields and brings us one step closer to a healthier, more sustainable, and harmonious coexistence with the animal kingdom.

Thank you for your contributions and dedication!

(Rajeev Rai Bhatnagar)

MESSAGE

It gives me immense pleasure to know that The Jammu & Kashmir Veterinary Doctor Association, Kashmir (JKVDA-K), is bringing out a Veterinary Journal **"VET PRISM".** The launch of the first issue of the Journal is expected to initiate new milestone in the advancement of the veterinary profession in this UT. This endeavor would go a long way in highlighting working of veterinary fraternity in the field; highlight new concepts and technological approaches being followed by the veterinarians at different levels; create awareness among rural masses about various developments, advancements/achievements made by the department and also to highlight need to adopt the latest practices and innovation in livestock farming and health at ground level.

I wish Jammu & Kashmir Veterinary Doctors Association all the success in their future endeavor.

Shri. Shailendra Kumar (IAS)

Principal Secretary
Agriculture Production Department
Government of Jammu & Kashmir

MESSAGE

It gives us immense pleasure to launch the first edition of the journal "**Vet Prism**". Our long conceived dream come true during this one day technical conference on **17th World Rabies Day 2023**, comemorating the theme of "*All for 1 and one health for all*". It was our aspiration to come with a Journal which could represent all the veterinarians especially the field veterinarians of twin departments of Animal and Sheep Husbandry, Jammu and Kashmir. **The Vet Prism Journal** is the scientific organ of the Jammu and Kashmir Veterinary Doctors Association (JKVDA) and has a mandate to serve as a platform for Veterinary professionals to present their research work, studies and scientific observations in the field of Veterinary Sciences, Animal Health and Production.

At this juncture, I would like to congratulate all the members who have contributed for the cause. Besides **JKVDA executives**, it happened with the dedicated efforts and contributions of Chief-editor, Editor, The editorial board and Reviewers. – I salute you all.

Dr. Reyaz Nazir Reshi

President
J&K Veterinary Doctors Association

From Chief Editor's Desk

Owing to ever changing challenges, emerging diseases, growing livestock product demands and challenging economic conditions, the veterinary medical practices are undergoing tremendous expansion in research & development. Realizing the significance of knowledge sharing and keeping the fellow professionals abreast through this technical bulletin is envisaged to contribute positively.

The launch and initiation of a new journal is always auspicious and exciting. So with immense pleasure, the first issue of biannually proposed journal "VET PRISM", a journal of veterinary profession is released on the forthcoming World Rabies Day on September, 28, 2023.

It is expected that "VET PRISM" will provide a platform for exchange of knowledge and ideas to deal with emerging challenges in improving livestock health and productivity to address the issue of unemployment and economical recession.

I express my reverential feelings to Dr. Reyaz Nazir Reshi, President JKVDA and other executive members of JKVDA including Dr. Sheikh Abrar Hassan, Dr. Shabir Ahmad Dar and Dr. Zahid Bashir Khanday for their sympathetic attitude and incessant help in publication of the journal.

The counsel and the extraordinary services rendered by the editorial board especially the Editor Dr. Raja Wasim Yousuf is highly acknowledged, without their valuable suggestions and dedication this may not have been possible.

I would like to place on record sincere thanks to all contributors for their overwhelming response and timely valuable contributions.

It is expected that the journal succeeds in spreading good quality and useful technical knowledge through its publication and continues to flourish and improve upon in the days to come.

With Best regards!

Dr. Shabir Ahmad Teli
Editor – in – Chief

Vet Prism Journal

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Cadaveric, Organ Bath and Real-Time Ultrasonographic Studies on Rumen in Calves

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Abstract

The present study was aimed at determining ultrasonographic evaluation of rumen in calves up to 9 months of age to develop baseline data that could be used for their diagnostic evaluation. The study was carried out in three phases and the calves were divided into three groups viz. neonatal (G1), pre-ruminant (G2) and ruminating (G3). Cadaveric and in-vitro organ bath ultrasonography was followed by comparative real-time in-vivo ultrasonography on live calves. The cadaveric study showed rumen was the second largest organ, roughly compared to the abomasum in G1 and the largest organ of the gastrointestinal tract in G2 and G3. Rumen location was highly variable with each group of animals. Rumen was closely associated with the liver through the craniodorsal surface in the animals of G1 and through anteriovisceral surface in the animals of G2 and G3. Organ bath Ultrasonogram depicted distinct three-layered patterns with well-appreciated rumen pillars. Real-time in-vivo studies revealed rumen was visible only from the left side in G1 compared to other groups. Rumen morphology was quite appreciable in the 12th intercostal space (ICS) in all groups. The distance between the dorsal midline and the ventral visible margin of the rumen remained unchanged. Rumen wall appeared as an echoic single line in the G1 but the actual groove separating the dorsal and ventral sacs of rumen was seen in the G2 and G3. Dorsal and ventral sacs were of the same size in G1 Animals contrary to other groups.

Introduction

The calf should adapt quickly to its new environment in the first months of life. Major physiologic and anatomic changes occur in a stressful environment, especially changing from a milk-fed monogastric to a ruminant. Clinical presentation of abdominal diseases in calves often may be different from adult cattle, ranging from sudden death to chronic bloating. A thorough clinical evaluation of the animal leads the veterinarian to take proper action (Mulon & Desrochers, 2005). Ultrasonography is useful to determine the location of pathology,

reaching a definitive diagnosis (Braun *et al*., 1995) or aiding in differential diagnosis of abdominal conditions (Iselin & Steiner, 1993). Ultrasonographic findings in mature cattle forestomach are not directly applicable to calves (Braun, 2016). Thus, the goal of the present study was to investigate the ultrasonographic appearance of rumen in calves.

Materials & Methods

The research consisted of three phases: a cadaveric study, an in-vitro organ bath study, and an actual comparative phase. The aim of the study was to gain knowledge about the topographic anatomy and echo the texture of the calf rumen, which was further followed by real-time in vivo ultrasonography (RTU) of normal live calf rumen at different age stages (Table 1). The organ bath study was conducted by immersing a whole or a part of the rumen in a water bath at a temperature of 36°C and repeatedly subjecting it to ultrasonography using a 7.5 to 12 MHz linear transducer.

Table 1: *Category and group size for different phases of study*

Group	Category of the calf	Age	Number of animals	
			Cadaveric & Organ bath Studies	RTU Studies
G1	Neonatal calves	1-30 days	02	06
G2	Pre-ruminant calves	2-3 months	02	06
G3	Ruminant calves	6-9 months	02	06

A B-mode ultrasound machine (Esaote MyLab 40 Vet) equipped with linear and sector transducers operating at frequencies between 3.5 and 12 MHz was utilized in real-time. Adequate amounts of Sonography transmission gel (Aquasone 2000) were administered onto the patient's body surface prior to the application of the transducer.

Preparation of animals: Calves were secured in standing positions without any sedation. The abdominal area of each calf, from tuber-coxae to 5th intercostal space in a horizontal plane and from the dorsal midline of the vertebral column to linea alba on both sides in the vertical plane was shaved and cleaned with tap water followed by isopropyl alcohol.

Scanning technique: Calves were examined with 3.5 MHz curvilinear transducer followed by a 10-12 MHz linear transducer. The maximum depth of field for this transducer was 7-12 cm.

Ultrasonography: The studied sonographic parameters were: A) Acoustic window B) Echogenicity patterns C) Location of the organs D) Biometry of the organs.

The sites where transducers could be placed to obtain the best images were identified based on the Braun et. al (2013) studies, and their locations were recorded. The size measurements were taken, and the average values with standard errors (SE) were recorded.

Statistical Analysis: The data were statistically analyzed by Statistical Package for Social Sciences (SPSS) software using "one-way ANOVA" for comparing the means. The values were considered significant at the significance level, $p \leq .05$. The means were subjected to Duncan's Multiple Range Test (DMRT) to compare groups

Results Discussion

(I) Cadaveric study: In neonatal calves (G1) rumen was the second largest

organ of the gastrointestinal tract (GIT) after abomasums (Plate 1). In pre-ruminant calves (G2) rumen was larger, roughly double as compared to abomasum, however in the animals of group 3 (G3) it was the largest organ of GIT as well as of the whole abdomen. Rumen location was highly variable with each group of animals. Rumen was located away from the left lateral abdominal wall nearer to median plane. Rumen extended anteriorly up to the 9th intercostal space (ICS) in the animals of G1, up to the 7th ICS in the animals of G2 and 5th ICS in the animals of G3. Dorsally rumen extended up to mid flank in the animals of G2, while the flank was completely occupied by the rumen in the animals of G3. In the animals of all the groups' the rumen through its parietal surface was attached to the caudodorsal base of the spleen. Rumen was closely associated with the liver through the craniodorsal surface in the animals of G1 and through anteriovisceral surface in the animals of G2 and G3. The average size of the dorsal sac (DS) and ventral sac (VS) of the rumen in the animals of G1 was about 7 and 9 cm respectively (Table 2) while the size (DS/VS) was 19/24 cm and 28/34 cm in the animals of G2 and G3 respectively. Rumen papillae were absent in the animals of G1, in the developmental stage in the animals of G2 and completely developed in the animals of G3.

Table 2: *Dimensions of the rumen in calves of different groups (all values in cm)*

Group	Dorsal Sac	Ventral sac
G1	7	9
G2	19	24
G3	28	34

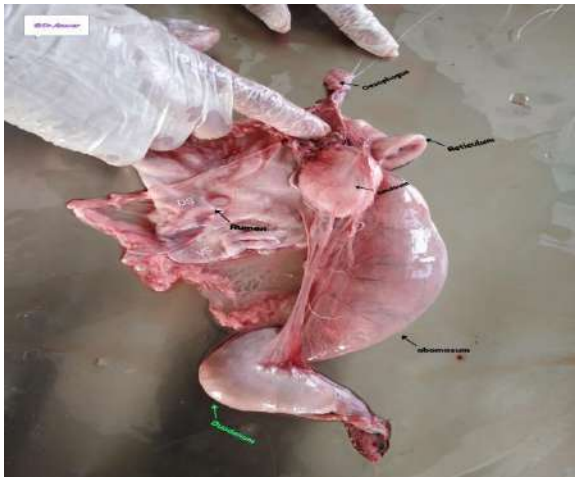

Plate 1: *Cadaveric appearance of rumen*

(II) In-vitro organ bath ultrasonographic study: The ruminal wall under ultrasonography appeared to consist of distinct three layers with hyperechogenic serosa & mucosa sandwiching hypoechogenic muscularis layer (Plate 2). Mucosal papillae appeared hypoechogenic as compared to the ruminal wall and could be slightly appreciated only in the animals of G3. Rumen pillars were well appreciated if the rumen was filled with water.

Plate 2: *In-vitro sonogram of rumen (sagittal plane) 1. Tunica serosa 2. Tunica muscularis 3.Tunica mucosa 4. Rumen pillars*

(III) Real-time ultrasonographic study:

Acoustic Window. Rumen was visible only from the left side in G1 animals (Fig. 1) but from both sides in the animals of the other two groups. It was visualized from the left upper mid flank to the 7th Intercostal space (ICS) in the animals of G1, up to the 6th ICS in G2 animals and up to the 5th ICS in G3 animals. Rumen morphology was quite appreciable in the 12th ICS in all groups (Plate 3). Distance between the dorsal visible margin of the rumen and the dorsal midline was greatest in the 7th ICS and smallest in the 12th ICS in the animals of all groups. In the flank, the distance between the dorsal midline and the dorsal margin of the rumen increased as compared to the 12th ICS. Contrarily, the distance between the dorsal midline and the ventral visible margin of the rumen remained unchanged**.**

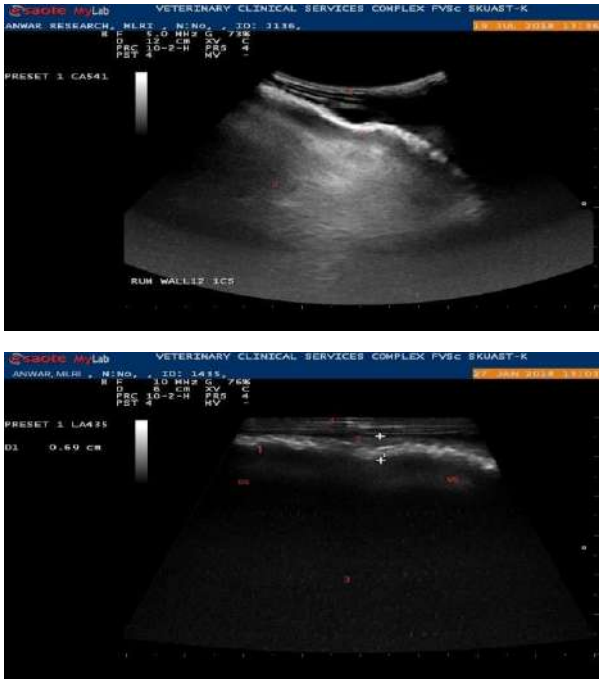

Plate 3: *Real-time ultrasonogram of 2-week-old calf rumen (A) Wall, (B) Developing groove, DS dorsal sac, VS ventral sac*

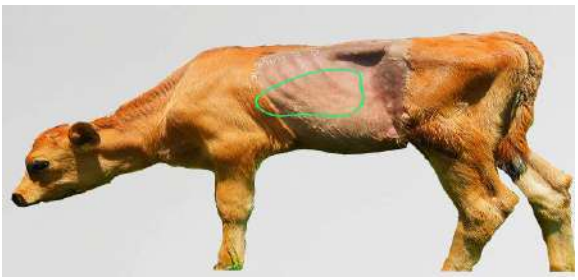

Fig.1. *Acoustic window for ultrasonographic rumen scan in calves*

***Echogenicity Patterns*.** Wall of the rumen appeared as an echoic single line (Plate 3A). A longitudinal groove in the rumen appeared on its left side as a mucosal fold in the animals of G1 (Plate 3B) but the actual groove separating the dorsal and ventral sacs of the rumen was seen in the animals of G2 and G3. In G1 animals the rumen contents were anechoic with hyperechoic stippling (Plate 3A). Reverberation artifacts emanating from the dorsal portion of the rumen indicate small dorsal gas caps in the animals of G1. No change in rumen appearance during and after the ingestion of milk could be visualized in the animals of this group. Similarly, a small gas cap dorsally and ingesta ventrally was observed in the animals of G2 & G3. Following the ingestion of grass, no change in ruminal appearance was observed in the animals of G2 and G3.

***Location*.** In the caudal abdomen, the rumen was in close proximity to the abdominal wall, however cranially at 11th & 12th ICS, the spleen was seen in between the abdominal wall and rumen. Craniodorsal margins of rumen in the 6th ICS were superimposed by lungs in the animals of all groups.

***Biometry*.** Dorsal sac (DS) and ventral sac (VS) of the rumen were of the same size in G1 animals (Table 3). In the animals of G2

and G3, VS was larger in size as compared to DS.

Rumen wall thickness showed a progressive increase across the different groups of animals, however, the increase in ruminal wall thickness was significantly ($p < .05$) different in the animals of G3 as compared to that of G1 (Table 3). The size of both the ruminal sacs dorsal as well as ventral showed a significant ($p < .05$) increase across all groups of animals as compared to G1 animals (Table 3).

Cadaveric, as well as in-vitro studies, resembled Real-Time Ultrasonography (RTU). However, overall echogenicity was lesser in RTU. There was no clear demarcation of wall tunics especially in G1 & G2 animals. Contents could not be seen especially in G3 due to the dorsal gas cap.

Table 3: *Mean ± SE (cm) Echo-biometry of calf rumen in the animals of different groups*

Group	Dimensions		
	Rumen wall thickness	Rumen dorsal sac	Rumen ventral Sac
G1	0.79±0.03[a] (0.71-0.86)	7.25±0.5[a] (5.91-8.59)	7.13±0.70[a] (5.34-8.92)
G2	0.88±0.0 [a] (0.86-0.90)	19.67±0.5[b] (18.23-21.10)	21.00±2.10[b] (15.61-26.39)
G3	1.19±0.0[b] (1.03-1.34)	27.67±1.0[c] (24.96-30.38)	32.83±1.22[c] (29.69-35.98)
Superscripted [a,b,c] values represent statistical non-significance Range in parentheses as 95% CI			

Discussion

In newborn calf the rumeno-reticulum has about half the capacity of the abomasum but remains collapsed and functionless. At 8 weeks of age, the rumeno-reticulum equals that of the abomasum and their combined capacity becomes twice that of the abomasum at about 12 weeks. During this study, the exact double capacity of rumeno-reticulum as that of abomasum was observed at 13-14 weeks. Rumen in newborns extends between the 9th - 12th ICS (Habel, 1975) and remains confined to left dorsal and cranial corner of the abdomen and is generally found collapsed (Singh, 2017). In adult cattle at about one and a half year age, the rumen forms the largest compartment of the forestomach and lies in the left half of the abdominal cavity extending from the diaphragm i.e. 7th to 8th ICS up to the transverse plane of tuber coxae (pelvic inlet). It extends via the median plane to the right half of the abdomen (Ommer and Harshan, 1997). In the current study, the rumen extended from flank to 9th ICS, 7th and 5th ICS in the animals of G1, G2 and G3 respectively. It occupied the whole flank in the animals of G3 and anterio-dorsal part of the flank in the animals of G1.

In mature cattle, the parietal surface of the rumen remains in contact with the left and ventral abdomen wall and visceral surface with intestines, liver, omasum and abomasum. The dorsal curvature of the rumen bears the spleen (Budras and Habel, 2003). During this study, the rumen in neonatal calves was seen as located away from the abdomen wall and placed medially. The prominent left-sided approach was seen in the animals of G2 while bilateral extension and almost close association of the rumen with the left abdomen wall was recorded in the animals of G3. A fair agreement between the above-quoted study and our study was observed with regard to associations of visceral surfaces of

the rumen with other organs. The spleen was found attached to the dorsal sac of the rumen and dorsal body wall at 12th ICS and ventral to lumbosacral arch in neonatal calves of 4 months of age. The dorsal sac of the rumen in these calves extended dorsally up to the 3rd to 4th lumbar transverse processes. These findings substantiate the observations of Reymond and Stanlay (2010). Development of rumen papillae was found dependent upon the feeding patterns of calves, as the calves put on grass feeding earlier were having developed papillae even in the animals of group G2. These observations are in close agreement with those of Heinrichs (2005).

Organ bath studies showed the distinctive three-layered pattern of hyperechogenic serosa and mucosa sandwiching hypoechogenic muscularis layer was seen in all the groups. Hypoechogenic papillae (compared to the ruminal wall) were slightly appreciated only in the animals of G3. Rumen pillars were well appreciated if the rumen was filled with water. Similar observations are reported in adult cattle (Imran, 2010; Tiwari, 2012) and in sheep (Movahedi *et al.*, 2017). However, the thickness of the rumen wall layers appeared variable along the course. The muscularis layer of rumen pillars appeared thicker than other parts in the present study. Real-time ultrasonographic study of the rumen yielded a quite appreciable view in 12th ICS in all the groups because of the least interferences due to other abdominal organs. These findings substantiate the observations of Braun (2013), who could also see the rumen at all examinations in calves from birth to 100 days of age; however, the findings are in contrast with those of Jung (2002). The technique used to determine the size of the rumen was analogous to Braun *et al.*, (2011) in goats and Braun *et al.*, (2013) in calves and was found easy, and appropriate. The distance between the dorsal midline and rumen wall was greatest at 7th ICS and smallest at 12th ICS. In the flank, the distance between the dorsal midline and the dorsal margin of the rumen increased as compared to 12th ICS. Contrarily, the distance between the dorsal midline and the ventral visible margin of rumen remained unchanged. This could be attributed to the exponential extension of rumen especially its dorsal sac compared to its ventral sac. Exactly similar views were presented by Braun *et al.* (2013) while scanning the rumen of Holstein Friesian calves.

The rumen wall appeared as an echogenic single line and the three-layer pattern could not be appreciated at any interval in any of the groups. Contrarily Braun *et al.* (2013) could observe clearly three layers of ruminal wall in calves including the serosal, muscular and mucosal using a 13 MHz transducer. With the advancement in the age of the calves, ruminal wall thickness increased significantly. These findings are contrary to those of Braun *et.al* (2013) who reported a non-significant increase in ruminal wall thickness with the advancement of age in calves. The longitudinal groove in rumen appears on its left side as a mucosal fold but the actual groove separating the dorsal and ventral sacs of rumen develops with advancement in age (Braun *et al.*, 2013). In G1 animals the rumen contents were anechoic with hyperechoic stippling. Reverberation artifacts emanating from the dorsal portion of rumen are indicative of small dorsal gas caps (Braun *et*

al., 2012 and 2013). The appearance of rumen remained unchanged irrespective of ingestion of milk or feed. These observations fall in line with those of Braun *et al.* (2012), and Braun and Gautschi (2012). The location of rumen and spleen in G3 animals, superimposition of craniodorsal margins at 6th ICS in all groups, and relative size of dorsal and ventral ruminal sacs in all three groups was in agreement with those of Braun *et al.* (2013).

Conclusion

The size, location, position and sonographic features of the rumen in calves show considerable variation according to their age and differ from those of the adult animals. Ultrasonography proves to be an excellent diagnostic tool for evaluating rumen in calves.

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Evaluation of Biofilm-Forming Potential of *Staphylococcus aureus* Isolated from Bovine Mastitis in Kashmir Valley

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Genes ica & FnBPA;
Staphylococcus aureus.

Abstract

Bovine mastitis, a disease that causes significant economic losses in the dairy industry worldwide, is commonly associated with the formation of biofilms by *Staphylococcus aureus*. In this study, we aimed to investigate the potential of *S. aureus* isolated from cows with acute and subacute mastitis to form biofilms by detecting virulence genes known to be responsible for biofilm formation. We tested 150 milk samples from mastitic cows referred to the Veterinary Clinical Complex, Shuhama (Aulesteng) SKUAST-K, and 80 samples were positive for *S. aureus*. Gene screening showed that 67.5% of the isolates had the *ica* A gene, 41.25% had *ica* B, 38.75% had *ica* C, 43.75% had *ica* D, 38.75% had *FnBPA*, and 37.5% had all of these genes, indicating that these isolates have the potential to form biofilms both in vitro and inside the mammary gland of cows.

Introduction

Reduced milk quality, output, and profitability due to treatment costs are all symptoms of bovine mastitis, a serious condition that affects the dairy industry (Sharma *et al*., 2013). Bovine mastitis has both gram-positive and gram-negative bacteria as potential causes. *Staphylococcus aureus* has typically been linked to asymptomatic, chronic intra-mammary infections that do not improve with antibiotic therapy (Ghanwate *et al.*, 2014). Bacterial biofilms are intricate communities of bacteria that are connected to surfaces and held together by an extracellular polymer matrix mostly made of polysaccharides, proteins, and DNAs.

Staphylococcus aureus, an opportunistic pathogen with characteristic polysaccharides and adhesion protein factors on the surface, forms a bacterial biofilm. According to Melchior *et al.* (2007), bacterial cells bind to the epithelial cells in the mammary gland alveolar surface epithelium and develop into colonies that are encased in an extracellular matrix. This promotes the chronicity of infection by creating biofilms.

According to Vasudevan *et al.* (2014), 91% of the *S. aureus* isolates from bovine mastitis were capable of generating biofilms in vitro. Exo-polysaccharide poly-N-acetyl-B-1,6-glucosamine (PNAG), which is produced by enzymes expressed in the *icaADBC* operon, is the primary component of Staphylococcal biofilms that is responsible for intercellular contacts. The intercellular adhesion (*ica*) locus, which is made up of the genes *icaADBC* that code for proteins, is found in staphylococci species. Among the *ica* genes, *icaA* and *icaD* have been shown to be crucial for *S. aureus* and *S. epidermidis* in the development of biofilms.

Due to the limited number of antimicrobial agents that can be used to treat *S. aureus, especially* MRSA, early detection of the condition and its susceptibility pattern including the ability to form biofilm, become essential for treatment. Therefore, it is essential to research the overall prevalence of *S. aureus* in Kashmir in order to create better and more effective treatment protocols. Thus, the aim of the study was to investigate the prevalence of *S. aureus* in Kashmir and determine its ability to form biofilms, in order to develop more effective control measures for bovine mastitis.

Materials & Methods

Sampling was done as described in our previous study, Shah *et al.*, 2019. In a nutshell, around 150 mastitis milk samples were examined for the genes that encode for the biofilm formation in *S. aureus* isolates. The samples were enriched in tryptic soy broth and cultured on Mannitol Salt Agar (Lade *et al.*, 2019; Sannat *et al.*, 2022). The *S. aureus* isolates then were identified by Gram staining and standard biochemical tests (Pumipuntu *et al.*, 2017, Shah *et al.*, 2019). DNA was extracted using heat lysis method (snap chill method) and confirmed by *nuc* gene-specific PCR (Easaw *et al.*, 2022).

Polymerase Chain Reaction Assays

All the *S. aureus* isolates were screened for the presence of five virulence biofilm-forming genes viz intercellular adhesins (*icaA, icaB, icaC, icaD)* and fibronectin-binding protein (*FnBPA)* using a PCR assay as per the protocol of Atshan *et al.*, 2012 and Piroth *et al.*, 2008, respectively. All the reactions were analysed in simplex PCR. The primers and reaction conditions used for the amplification of the genes are shown in Table 1. All the PCR reactions were carried out in a Master cycler gradient (Eppendorf, Hamburg Germany). The 25µl reaction mixture consisted of 2.0 µl DNA template, 2.5 µl of 10X buffer, 0.2 µl of dNTP mix (25 mM), 2 µl of $MgCl_2$ (25 mM), 1 U of Taq DNA Polymerase (Fermentas Life Sciences), 0.5 µl of each primer (0.5µM) and quantity sufficient sterile nuclease-free water. The cyclic conditions of *icaA* and *icaB* genes were initial denaturation at 94 ºC for 4 min, followed by 30 cycles of 94 ºC for 30 sec, 56 ºC for 30 sec and 72 ºC for 1 min. This was followed by the final extension step at 72 ºC for 10 min. The same cycling conditions were used for *icaC* and *icaD* genes except for the annealing temperature that was 49ºC for *icaA* and 48 ºC for *icaD*. The cyclic conditions of the *FnBPA* gene consisted of initial denaturation at 94 ºC for 5 min, followed by 35 cycles of 94 ºC for 30 sec, 56 ºC for 30 sec and 72 ºC for 1 min, followed by a final extension at 72 ºC for 7 min. The amplicons were analyzed by electrophoresis on 1.5 % agarose gels stained with ethidium bromide.

Table 1: *Primers used for screening of biofilm genes*

Gene	Primer sequence	Amplicon size (bp)	Reference
icaA	F-ACACTTGCTGGCGCAGTCAA R-TCTTGGAACCAACATCCAACA	188	Atshan *et al.*,(2012)
icaB	F-AGAATCGTGAAGTATAGAAAATT R-TCTAATCTTTTTCATGGAATCCGT	900	Atshan *et al.*,(2012)
icaC	F-ATGGGACGGATTCCATGAAAAAGA R-TAATAAGCATTAATGTTCAATT	1100	Atshan *et al.*,(2012)
icaD	F-ATGGTCAAGCCCAGACAGAG R-AGTATTTTCAATGTTTAAAGCAA	198	Atshan *et al.*,(2012)
FnBPA	F-AGGGATCCGATGGTGGAGGTGGAT R-AGCCCGGGTGGCGTTGGTGGCACG	702	Piroth *et al.*,(2008)

Results

A total of 80 (53.33%) *S. aureus* isolates were recovered from 150 mastitic milk samples (Shah *et al.*, 2019) (Fig. 1). Since, detection of virulence biofilm genes is an important step to elucidate the biofilm-forming abilities of *S. aureus* in mastitic udders, so all the isolates were screened for biofilm forming genes *icaA* (Fig. 2), *icaB* (Fig. 3), *icaC* (Fig. 4), *icaD* (Fig. 5) and *FnBPA* (Fig. 6).

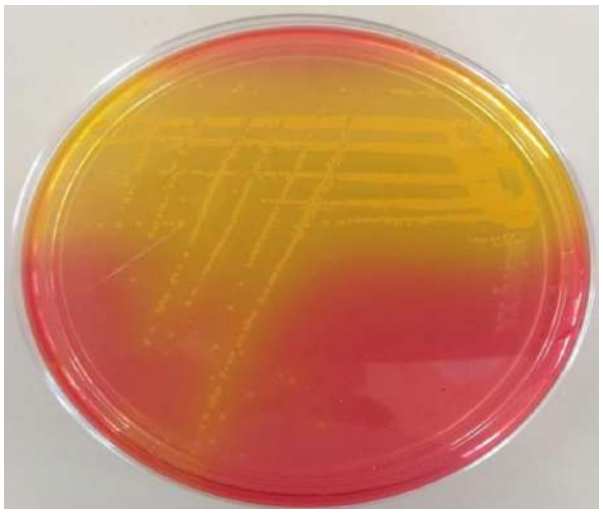

Fig.1. *Golden yellow colonies on mannitol salt agar (MSA), depicting fermentation of mannitol, a characteristic of S. aureus.*

Among all the isolates, 54 (67.5 %) isolates were positive for *icaA*, 33 (41.25%) were positive for *icaB*, 31 (38.75%) were positive for *icaC*, 35 (43.75%) were positive for *icaD*, 31 (38.75%) were positive for *FnBPA* and 30 (37.5%) were positive for all the virulence biofilm genes.

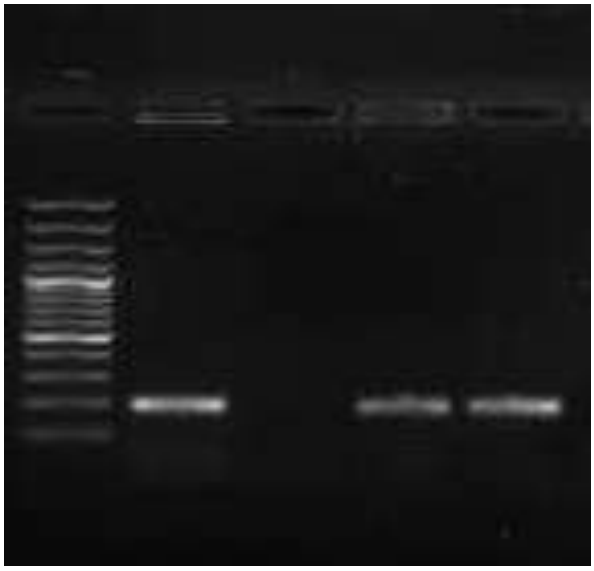

Fig.2. *icaA gene (188 bp), 100 bp DNA marker followed by wells of positive control, negative control, and two isolates.*

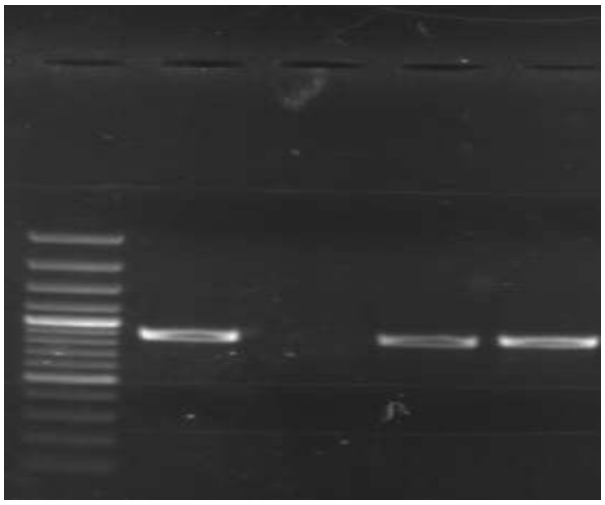

Fig.3. *IcaB gene (900 bp), 100 bp DNA marker followed by an amplified band of positive control, and two positive isolates.*

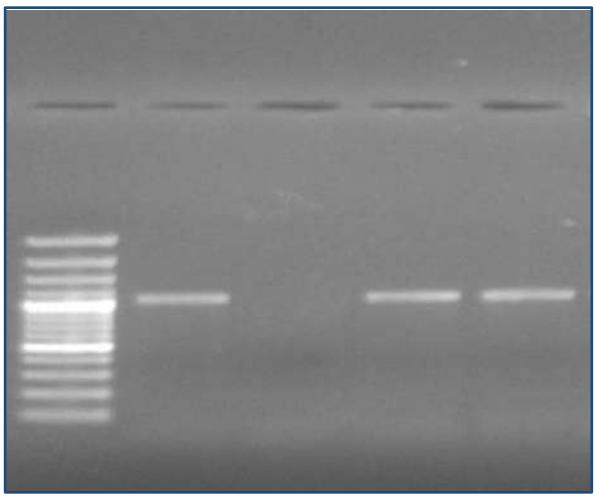

Fig.4. *icaC gene (1100 bp), 100 bp DNA marker followed by an amplified band of, P: positive control, and two positive isolates.*

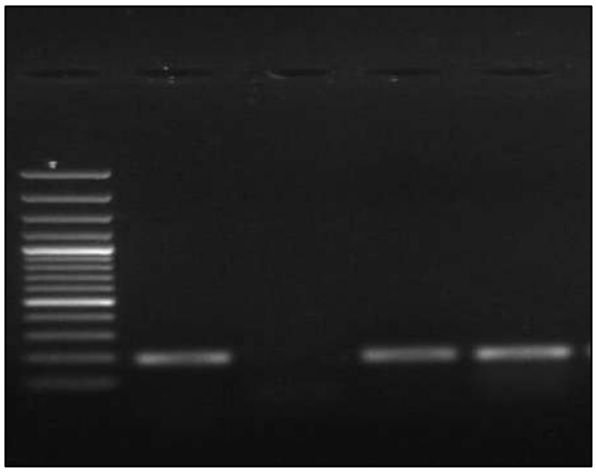

Fig.5. *IcaD gene (198 bp), 100 bp DNA marker followed by an amplified band of positive control and two positive isolates.*

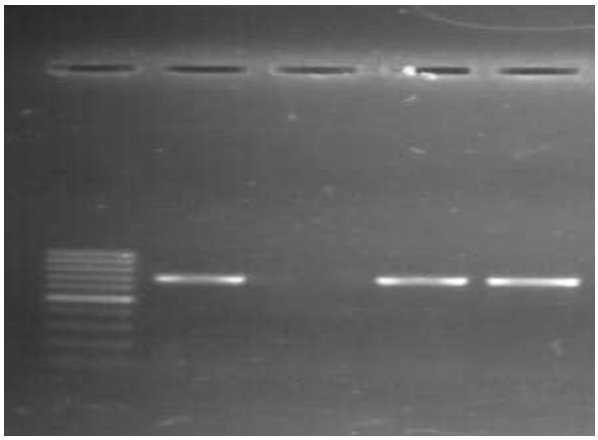

Fig.6. *FnBPA gene (702 bp), 100 bp DNA marker followed by an amplified band positive control and two positive isolates.*

Discussion

Biofilms are of significant concern due to their involvement in many animal diseases, bovine mastitis being important owing to its great impact on the livestock economy (Bradely *et al.*, 2002; Abdullahi *et al.*, 2015). The ubiquity of *S. aureus* isolates to form biofilms and inherent multi-drug resistance properties is a compelling force behind research for a better solution to combat antimicrobial resistance especially due to the decreased penetration of antimicrobials through biofilm matrix for the treatment of clinical and sub-clinical mastitis.

According to Cucarella *et al.* (2004), the bovine intramammary gland may support persistent *S. aureus*-related biofilm formation in chronic mastitis infections due to the presence of biofilm-associated proteins (Bap). *S. aureus* isolates from intramammary sources, like milk, were found to be significantly more likely to produce a biofilm than those isolated from external sources, like the milking machines, indicating that biofilm production is unquestionably a risk factor during intramammary infection (Cucarella *et al.*, 2004). According to research (Kaur *et al.*, 2013), the prevalence of sub-clinical mastitis, the cause of herd outbreaks, is 10–50% in cows and 5-20% in buffalo, compared to 1–10% in cases of clinical mastitis.

Ghasemian *et al.*, (2015) isolated 48 *S. aureus* isolates, 30 from blood and 18 from wounds based on confirmation with coagulase test, mannitol fermentation, colony morphology and DNase test. These isolates

were further screened for biofilm genes *ica ABCD* and it was found that among 30 blood isolates, 21 (70%) were positive for *icaA*, 14 (48 %) for *icaB*, 19 (64 %) for *icaC* and 18 (60%) for *icaD*, while among 18 wound isolates, 9 (50 %) isolates were positive for *icaA*, 7 (39%) for *icaB*, 6 (34%) for *icaC* and 12 (67%) for *icaD* which reveals that *icaA* and *icaC* were more frequent in blood isolates and *icaA* and *icaD* were more frequent in wound isolates associated with biofilm formation. while in this study, 54 (67.5 %) isolates were positive for *icaA*, 33 (41.25%) were positive for *icaB*, 31 (38.75%) were positive for *icaC*, 35 (43.75%) were positive for *icaD*, 31 (38.75%) were positive for *FnBPA* and 30 (37.5%) were positive for all the virulence biofilm genes, indicating more prevalence of *icaA, icaB and icaD* genes among *S. aureus* isolates in bovine mastitis milk.

Conclusion

In conclusion, the biofilm-forming abilities of *S. aureus* isolated from bovine mastitis milk were evaluated in this study. The majority of the isolates were positive for at least one of the virulence biofilm genes, with *icaA* being the most prevalent among all the isolates. These findings suggest that biofilm formation plays a critical role in the pathogenesis of mastitis infection in dairy cows and may contribute to persistent infections. Therefore, understanding the mechanism of biofilm formation by *S. aureus* in mastitic udders may provide a potential strategy its prevention.

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Treatment Protocol and Management of Downer Cow Syndrome in Field Conditions of Kashmir

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Physiotherapy.

Abstract

Seven crossbred Jersey and Holstein Friesian cows presented with sternal or lateral recumbency and subnormal temperature during 2020-2022. All animals were unable to rise on their own after >72 hours, one of them was in advanced pregnancy and remained in sternal recumbency for 22 days. All seven cows had previously received calcium and magnesium borogluconate therapy without success before being treated by the author. However, the combination therapy adopted subsequently successfully treated all downers except one cow which had hip dislocation.

Introduction

Management of recumbent/downer animals is a most daunting task for veterinarians. Downer cow syndrome also known as 'post-parturient recumbency is mainly a post-parturient phenomenon when a cow is weak, or sick to stand or walk (Carolyn *et al.*, 2007). Most of the affected animals were usually bright and alert but were unable to stand on their own. All the physiological and clinical parameters were within normal ranges at the time of examination and cows were in sternal recumbency and were attempting to get up. Geetha and Gnanraj, (2017) have proposed that when a post-parturient recumbent cow does not get up even after two successive calcium therapies, such a condition is said to be classified as 'downer'. Downer cows have usually two types i.e. 'alert downer' and 'non-alert downer'. Alert downers are comparatively more active than non-alert ones, showing normal appetite, urination, defecation and normal body temperature. Sternal recumbency is the hallmark of alert downers and shows crawling with forelimbs struggling to get up. Downer syndrome has been reported to occur as a result of a combination of the factors like milk fever, hypo-phosphatemia, Vitamin D, E & selenium deficiency, excessive protein intake, recumbency due to trauma and malnutrition (Lyons Neil, 2022).

Clinical observations

Except for lateral recumbent cows, all physiological parameters, including heart and respiratory rates, were within the normal range. Body temperatures ranged from 99.8 - 101.8 ^{0}F. Six cows were in sternal recumbency, making repeated attempts to stand up but failing. The cows were physically lifted by men in order to test their ability to support weight on their legs. By pricking each leg with an 18 gauge needle to test for pain sensitivity, it was possible to rule out nerve injury in all four limbs. All four limbs

were sensitive to pain. One of the affected cows had a hip dislocation, which was late in being reported to us, upon inspection of the hind limbs by elevating the limbs upward.

Treatment & management therapy

Treatment was devised on the basis of certain criteria like a) number of days an animal remained recumbent after parturition b) the status of hypocalcemia and hypothermia c) appetite and feeding status and d) injuries and wounds. Ample straw bedding for the animals was ensured in all cases by putting straw and gunny bags beneath and animals were turned manually to change position till arrangements for slings were made. Five cows out of 07 were able to stand by lifting the hindquarter, body and head with the help of tarpaulin below the thorax and abdomen. The tarpaulin was prepared in a manner such that five spaces for legs and udder were created to hold the body firmly without any injury to the udder (Fig. 1). The hind limbs were tied to each other by a rope at the fetlock position. A maximum of 2 feet space between the hind legs was ensured to avoid slipping and frog sitting posture. It was also ensured that the animal must sit on the sternum only. Intramuscular Injection of isoflupredone, a glucocorticoid, was given on the 1st day of examination, followed by intramuscular injections of multivitamins, phosphorus and calcium for consecutive 3 days. Additionally, animals were given oral medication of multivitamins, mineral mixtures and nutritional supplements to maintain Ca:P ratio. Antibacterial and antifungal ointments were prescribed to treat the bed sores. Physiotherapy like massaging of legs and other body parts by old warm clothes or straw was provided to all the animals to ensure proper blood circulation to the extremities. The physical exercise of the animal after being lifted proved critical in positive results. Soft bedding and tarpaulin with self-designed supportive slings of different kinds was part of treatment protocol.

Fig.1. *Downer cow 3 days post treatment*

During recumbency, turning cows from one side to the other was ensured atleast twice a day to prevent further bed sores. Cows were assisted to stand for a significant time initially when weight bearing on the legs was present, otherwise only for minutes with supportive slings. The recovery period varied from case to case depending on the severity of symptoms.. The cow lifter made available by the Department of Animal Husbandry Kashmir was used in one of the recently reported cases, which saved labour, proved convenient and easy to install anywhere with the advantage of portability.

Discussion

The affected animals were either crossbred Jersey or Holstein Friesian breeds having more than 300 Kg body weight and were mid to high yielders. The signs and symptoms of all the animals varied both in degree and nature. The prognosis depended upon the severity and the number of days after

the treatment ensued. In cases where treatment was started promptly, the animals showed faster recovery within 2-3 days post-treatment. After the treatment was provided, the 8th-month pregnant cow stood on her own 22 days of sternal recumbency and delivered normally 37 days later. One of the animals with lateral recumbency didn't respond to treatment as the animal had also suffered hip dislocation, so the animal could not be lifted. Rest all other animals recovered successfully. The downer animals need to be treated with combination therapy as soon as possible otherwise prognosis remains guarded to poor. Ischemic necrosis of muscles occurs if treatment is delayed, leading to permanent recumbency (Radostits *et al.*, 2000). The extent of muscle injury may be monitored through the creatine kinase activity in serum which increases many folds in downer cows (Prasad *et al.*, 1988). Massaging of the muscles was also done to restore muscle activity of the limbs which has also been suggested by Chakrabarti (2016). The most common cause of downer cow syndrome is hypophosphataemia rather than hypocalcemia and downers had serum phosphorus level below 4 mg/dL (Wadhwa and Prasad, 2007).

Conclusion

The combination therapy of injectable & oral medications aiming to maintain the calcium-phosphorus ratio, ions and vitamins necessary to maintain muscle tone and nerve conduction optimally together with physiotherapy and management helped in the successful recovery of reported downer cows even after 22 days of maximum illness. This study concludes that immediate attention to combination therapy if followed keenly can save high economic merit dairy animals even after long recumbency.

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Performance of Exotic Rabbit (*Oryctolagus cuniculus*) Breeds at an Organized Rabbit Farm of Kashmir

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Abstract

Domestic rabbits are considered to be a suitable and alternate source of quality meat with high biological value and dietary benefits for people of all ages and with various health conditions. This study aimed to estimate early growth traits and litter size of exotic breeds of rabbits like Angora French/German, Black Brown, Californian White, Grey Giant, New Zealand White and Soviet Chinchilla. Data was collected from 278 kits born to 47 does, sired by 36 bucks and analysed using least squares techniques. Least squares means (LSMs) for birth weight (BW), weaning weight (WW), average daily gain (ADG) from birth to weaning (40 days body weight), litter size at birth (LS) and survivability (SR) from birth to weaning were estimated. The overall LSMs of 59.46±0.38 g, 526.10±3.85 g, 11.67±0.09 g/day, 5.56±0.26 and 95.37±2.45 were recorded for BW, WW, ADG, LS and SR indifferent exotic breeds of rabbits in the present study. The effect of birth type and breed was highly significant on BW, WW, ADG and SR in the present study. The effect of genotype was non-significant on LS

Introduction

According to Akinsola *et al.* (2014), domestic rabbits are extremely suitable for producing high-quality meat that contains quality protein at a rate of 20–21%. Rabbit meat has a high biological value in terms of composition of its amino acids, low calories, fat, sodium and contains a high amount of unsaturated fatty acids (60 % of total fatty acids). Children and people with heart ailments brought on by atherosclerosis, among others, might benefit greatly from eating rabbit meat because of its low fat and low cholesterol level. Owing to their high prolificacy, short gestation periods, low initial capital requirements, and excellent genetic flexibility, domestic rabbits are raised as a cheap source of meat (Akinsola *et al*., 2014). At the young/broiler stage, rabbit meat is more tender than chicken, but as the animal ages, the meat becomes less tender. Due to their attractive appearance, rabbits can also be kept as pets.

The genetic improvement of rabbits, which in turn requires an understanding of the genetic factors of growth features and the environment in which rabbits are raised, is a prerequisite for increasing the contribution of rabbits to the desperately required animal protein in the valley. The size of the litter is mostly determined by genetics in rabbits and reflects both the doe's productive capacity and maternal

skills. Crossbreeding can enhance this characteristic (Nofal *et al*., 2005; Zerrrouki *et al*., 2014). Furthermore, the survival rate of kits up to weaning is crucial for a successful rabbit farming operation as it significantly affects net income (Rashwan and Marai 2000).The most crucial economic characteristic in the production of rabbits is litter size, or the number of kits born per doe (Nofal *et al.,* 2005). The rabbit is an ideal animal for producing meat because of its high prolificacy and quick growth rate. However, according to Castellini *et al*. (2010), the profitability of rabbit production depends on the number of kits weaned and the number of litters produced by a doe, and more often maternal lines are chosen based on the size of the litter at weaning (Moce and Santacreu, 2010).

The ideal environment for rabbit production in Kashmir and the excellent market for rabbit meat given the high prevalence of hypertension, hypercholesterolemia and cardiac conditions among the population, rabbit cultivation could be a game changer in augmenting the output of white meat. However, awareness regarding the health benefits of rabbit meat is to be made amongst the general population of Kashmir to enhance its acceptability. The purpose of the current study is to analyse the performance of the rabbits at the Government Rabbit Breeding Farm in Wusan.

Materials and Methods

Study area and sampling

The Government Rabbit Farm established in 1978 at Wussan Baramulla Kashmir is the lone rabbit farm being maintained by the Department of Sheep Husbandry, Kashmir. The farm maintains various breeds of rabbits including Angora, Black Brown, Californian White, Grey Giant, New Zealand White and Soviet Chinchilla (Fig. 1).

The present study was conducted from July to September 2022. Breeds used for the present study include Angora French/German, Black Brown, Californian White, Grey Giant, New Zealand White and Soviet Chinchilla [Fig 2]. The data was recorded for 278 kits born to 47 does sired by 36 bucks at Government Rabbit Breeding Farm Wusan to estimate early growth traits and litter size. Breeding takes place from early spring (March) to late autumn (October) with a gestation period of approx 31 days. Kindling takes place during the same period. Breeding from October to March is avoided to prevent undue mortality due to harsh winter conditions. Weaning was performed at 40 days of age.

Statistical analysis

The data were suitably classified to study the effect of breed (6 groups) and birth type (6 groups). Least squares techniques outlined by Harvey (1990) were adapted to analyse the data with breed (1 to 6), and birth type (1-6) as fixed effects. The statistical significance of fixed effects in the least squares model was determined by the 'F' test. For significant effects, the Duncan's multiple range test (DMRT), a post hoc test, was performed to identify which specific groups of breed or birth types differ significantly from each other, after controlling for other factors.

Results & Discussion

The Least squares means (LSMs) for birth weight (BW), Weaning Weight (WW), Average Daily Gain from birth to weaning (40 days body weight, ADG), Litter Size (LS) and Survivability (SR) of rabbits were 59.46±0.38 g, 526.10±3.85 g, 11.67±0.09 g/day), 5.56±0.26 and 95.37±2.45,

respectively as presented in Table 1. The effect of birth type and breed was highly significant on BW, WW, ADG and SR in the present study. The effect of breed was non-significant on LS.

Overall birth weight of 0.46±0.01 g with a birth weight of 0.50±0.02 g, 0.45±0.02 g, 0.45±0.02 g, 0.46±0.02 g, 0.48±0.02 g and 0.42±0.02 g for Soviet Chinchilla, Grey Giant, Californian White, French Angora, German Angora and New Zealand White, respectively was reported by Khan *et al*, (2020). According to Fadare and Fatoba (2018), the kits from Palomino Brown had the heaviest kit weight (41.8 g) at delivery while the kits from New Zealand white had the lowest weight (35.6 g) at birth. In New Zealand White and Soviet Chinchilla, Ghosh *et al*., 2008 reported a weaning weight of 0.6-0.7 kg comparable to the result found in the present study. Likewise, Adelodun (2015) presented weaning weight estimates for four breeds of rabbits that were more or less comparable. Egena *et al*. (2012) reported a significant breed effect on the live litter bodyweight of rabbits in Minna, Nigeria. In rabbit breeds and their crosses, Chineke (2005) reported a significant effect of breed on kit weight. In contrast, it was shown that breed did not significantly affect individual weaning weight in local rabbits, as reported by Ghosh *et al*., (2008). The birth type was a significant source of variation for BW, WW and SR. This is obvious as litter size increases there is high interaction between kits for uterine space and nutrients during prenatal life. Therefore, with increase in litter size, litter weight decreases at birth and weaning whereas mortality percentage increases.

Litter size of 5.56±0.26 kits was observed in the present investigation with Soviet Chinchilla having LS of 6.00±0.57. However, the difference between different breeds with respect to LS was non-significant. Fadare and Fatoba (2018) observed a significant effect of breed on litter size with highest LS of 6.75 in New Zealand White followed by California and Havana black while least litter of 4.23 was observed in Palomino brown. However, Marykutty and Nandakumar (2000) reported non-significant effects of breeds on litter size and litter weight at birth with an average LS of 4.38 at birth. Kumaresan *et al.* (2011) also reported that there was no significant difference in litter size at birth in New Zealand White and other breeds. The study of Irekhore (2007) indicated that the California breed of rabbit produced a higher litter size at birth than New Zealand White.

Fadare and Fatoba (2018) reported higher percentages of mortality of about 39.02, 26.50, 12.20 and 16.02 % in California, NewZealand, Havana black and Palomino brown, respectively. High mortality is responsible for decreased litter size at weaning. These significant differences in the litter weight at weaning might be as a result of the number of surviving kits upto weaning.

Conclusion

The combination therapy of injectable & oral medications aiming to maintain the calcium-phosphorus ratio, ions and vitamins necessary to maintain muscle tone and nerve conduction optimally together with physiotherapy and management helped in the successful recovery of reported downer cows even after 22 days of maximum illness. This study concludes that immediate attention to combination therapy if followed keenly can save high economic merit dairy animals even after long recumbency.

Table 1: Least squares means for body weight traits in different exotic breeds of rabbits

Effect	N	BW (g)	N	WW(g)	ADG (g/day)	LS	SR (%)
Overall	262	59.46±0.38	238	526.10±3.85	11.67±0.09	5.56±0.26	95.37±2.45
Birth type		0.001**		0.001**	0.001**		0.000**
3	6	59.84±0.64^{d}	6	540.97±16.26^{c}	11.86±0.40^{cd}		100.00±10.46
4	44	63.02±1.29^{c}	44	540.97±6.05^{b}	11.94±0.15^{bcd}		100.00±3.89
5	45	58.54±0.60^{c}	40	520.35±6.64^{ab}	11.48±0.16^{abc}		100.00±3.97
6	70	57.99±0.60^{b}	57	546.81±5.45^{c}	12.24±0.13^{d}		81.53±3.20
7	49	59.47±0.55^{a}	49	508.01±6.00^{a}	11.36±0.15^{a}		100.00±3.86
8	48	57.93±0.67^{a}	42	499.48±6.55^{a}	11.12±0.16^{ab}		90.69±4.00
Breed		0.001**		0.001**	0.001**	0.897N	0.000**
Angora	41	59.84±0.64^{b}	40	510.05±6.49^{a}	11.25±0.16^{a}	5.25±0.53	97.12±4.13
Black brown	10	63.02±1.29^{d}	10	513.92±12.93^{b}	11.27±0.32^{ab}	5.00±1.07	100.00±8.31
Californian	59	58.54±0.60^{ab}	53	532.76±6.18^{bc}	11.85±0.15^{bc}	5.90±0.48	96.13±3.86
Grey Giant	54	57.99±0.60^{ab}	51	512.87±6.17^{a}	11.37±0.15^{a}	5.60±0.48	92.87±3.86
New Zealand	46	59.47±0.55^{b}	52	557.21±5.67^{c}	12.44±0.14^{c}	5.60±0.48	94.97±3.57
Soviet	42	57.93±0.67a	32	529.78±7.62^{ab}	11.80±0.19^{ab}	6.00±0.57	89.72±4.30

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Caesarean Section in Cows - A Clinical Review of Field Cases

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Abstract

The present retrospective study was conducted to analyse the survivability, future fertility and overall clinical outcome of caesarean section (c-section) in bovines in field conditions. The author recorded and analysed data from 25 cows in which caesarean section was performed due to occurrence of dystocia. A high survival rate of 100% was observed when caesarian was performed within 12-24 hours of dystocia and the dam survival rate decreased when the caesarean was performed after 24 to 36 hours of dystocia making the overall dam survival rate of 88%. Also about 80% of caesarean operated animals conceived when they were subjected to c-section within 12 hours of occurrence of dystocia; however only 42% of the animals conceived in which caesarean section was done after 12 hours of dystocia. There was no dehiscence of sutures and no suture abscess formation in any of the cases. In conclusion, caesarean section proved a clinically useful method for managing dystocia in cattle, resulting in a high dam survival rate, fertility rate with satisfactory clinical outcome.

Introduction

Caesarean section in cows is one of the most commonly performed surgical procedures in the field. Caesarean section is indicated in cases of those dystocia where a calf is difficult to deliver by mutation and extraction methods (Schultz *et al.*, 2008). According to Purohit *et al*., 2012, It is needed when obstetrical techniques have either failed or cannot be applied to deliver the foetus. There are several alternative surgical methods in bovines to approach for caesarean section with its own advantages and disadvantages but several factors like dystocia type, the size of animal, condition of foetus and the surgeon's preference determine the surgical approach. But the most commonly used are two: ventral midline caesarean section and paramedian lateral caesarean section (Schultz *et al.*, 2008).

Case history, clinical observations and surgical procedures

A total of 25 cows in the age group of 4 to 8 years with different parity having different causes of dystocia were presented to the author in a 2 year time period (2021-2022) within the territorial limits of Kupwara District, Kashmir. Most of the cases were priorly handled by the local para-vets or quacks and presented on the same day or one day after the onset of labour signs.

General physical and gynaecological examination was conducted in all cases and surgical decision was taken after all induction methods, mutational and tractional forces failed to relieve the dystocia.

Table 1: *Indications for caesarean section and no. of cows*

Indications for caesarean section	No. of cows
Foetal oversize	5
Incomplete cervical dilatation	3
Abnormal presentation	7
Foetal anasarca sequel to foetal death	3
Foetal anomaly (monsters)	1
Elective caesarean in broken spine dam	1
Irreducible uterine torsion	5

Fig.1. *Left lower oblique laparotomy*

A proper consent from the owner was taken before proceeding to surgical procedure. Surgical site was prepared aseptically after casting the animal in right lateral recumbency. Site of surgical incision, (left lower flank oblique) was same in all 25 cows with little modification as the individual case demanded (Fig. 1). Local infiltration anaesthesia was achieved by 50-70 ml of 2% lignocaine hydrochloride. Preoperative analgesics and antibiotics were given half an hour intravenously before starting the surgical procedure. Intravenous fluid line was maintained in selected cases which were recumbent or toxemic or hypovolemic at the time of presentation. Skin was incised followed by blunt dissection of fascia, muscles and peritoneum to reach the abdominal cavity. Gravid horn of the uterus was located and exteriorized towards the incision as close as possible to prevent abdominal contamination. Incision was given on the greater curvature of the gravid uterine horn and foetus was removed by traction followed by lembert suturing of the uterus by no. 1 chromic catgut. Around 4 to 6 Intrauterine Nitrofurazone & Metronidazole, Urea Bolus were placed into horn prior to closure and 300-400 ml of Metronidazole solution was used to irrigate the uterus and abdomen prior to abdominal closure. Detorsion was done in the cases where torsion was the cause of dystocia. Abdomen and skin was closed by routine closure method (Fig. 2) and postoperative follow up (Fig. 3) and in one case retrieval of conjoined twins having 2 separate heads with 8 limbs and attached at the thoracic spine making the monster dicephalus thoracopagus tetrabrachius tetrapus (Fig. 4).

Fig.2. *Interrupted suture pattern on skin*

Fig.3. *Post-operative follow-up of C-section cases*

Fig.4. *Fetal monster (dicephalus thoracopagus tetrabrachius tetrapus) retrieved from C-section*

Post-operatively, all the cows were administered antibiotics, analgesics and B-complex for around 5 days. Antiseptic dressing of the surgical wounds using povidone iodine was done on alternate days and the skin sutures were removed after 14 days.

Results & Discussion

The fundamental aim of the caesarean section is veterinary medicine is saving of the dam and calf and the future fertility of the dam (Campbell and Fubini, 1990). Several factors may affect the successful outcome of this procedure. Case selection is one of the most determining but undermined variable. Also the skin preparation, surgical technique, calf viability at the time of surgery and exteriorizing the uterus can affect outcome. Several procedures are available for caesarean section with great variability, and common principles guide the veterinarian in the approach and conduct of the procedure (Schultz *et al*, 2008); but lower flank oblique incision was chosen by the author in all the cases for its familiarity and easy exteriorization of uterus and extraction of foetus.

It has been experienced by the author that efforts to lift the entire uterus out through the abdominal incision before incising the uterus in-situ usually fail, as the cumulative weight of the foetus and uterus are too heavy for a person to lift. Therefore, it is better to bring the uterus out with the calf as it is exteriorized to limit the peritoneal contamination.

The study found that breed predisposition to dystocia was most common

in crossbred jersey cows (CBJ), with a rate of 56%. Nondescript cows had a lower rate of 24%, while crossbred Holstein Friesian (CBHF) cows had the lowest rate of 20%. This may be attributed to the relative population sizes of each breed in the area where the study was conducted.

In the current analysis, 80% of caesarean operated animals conceived when they were subjected to c-section within 12 hours of occurrence of dystocia but only 42% of the animals conceived where cases were presented after 12 hours of dystocia for surgical procedure. The most plausible explanation in support of this can be due to increased tendency for formation of uterine adhesions in delayed cases, resulting in delayed involution of uterus and endometritis. These findings can be supported by most of the studies previously done where higher plasma fibrinogen concentrations, stress, tissue damage and post-caesarean uterine adhesion formation were the chief findings in prolonged cases of dystocia (Dhindsa *et al*., 2009 and Dhindsa *et al*., 2010).

There was 100% calf survival rate in those cases where per rectal and/or per vaginal examination before caesarean revealed live foetus. There was no postoperative complication like suture dehiscence or peritonitis except in 3 cases; one had uterine torsion for 3 days before presentation leading to toxaemia and consequently death within 24 hours and 2 other cases had emphysematous foetus along with compromised uterine wall due to late presentation and excessive inexperienced handling which also died consequently.

Current analysis also revealed the dam survival rate of 100% when caesarian was performed within 24 hours of dystocia and the dam survival rate decreased when the caesarean was performed after 24 to 36 hours of dystocia making the overall dam survival rate of 88% in the present study. Dhindsa *et al*, 2019 have also reported the results in their study which is in concurrence to the present analysis. Peritonitis may develop following c-section by spillage of uterine fluids in the abdominal cavity, suture loosening and knot failure (Singh *et al*., 2002). Peritonitis can often result in uterine adhesions that invariably lead to death or infertility in post caesarean cows (Dhindsa *et al*., 2010).

Conclusion

The current analysis suggests that caesarean section in cows at field level has good success rate along with preservation of future reproductive efficiency when performed in the first 12-24 hours of onset of occurrence of dystocia and prompt timely action with good surgical technique can save the life of an animal. The information of this analysis shall enrich the knowledge of owner and field veterinarian for early diagnosis, treatment and management of dystocia and help field veterinarians in calculating the surgical risk for decision making.

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Bartholin's Gland Cyst in a Crossbred Jersey Cow - Case Review

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Abstract

This study reports three cases of bartholin's gland cysts in crossbred jersey cows. Two of them were presented with repeat breeding and a soft, painless protruding cyst-like structure. The third case presented with vaginal prolapse and a round fluctuating cyst protruding from the left lateral wall of the vagina. The cysts were treated by puncturing and aspirating the fluid, followed by injection of Lugol's iodine for chemical debridement. No recurrence was observed in either case, and all the cows had normal estrus cycles and were conceived with artificial insemination during subsequent cycles. Thus the current study highlights the value of careful examination and prompt treatment for reproductive abnormalities in cattle.

Introduction

Bartholin glands also called vestibular glands are paired and are found in the constrictor muscles of the vestibule, which secrete mucus most actively at the time of estrus. They have a tubuloalveolar structure and are approximately 1.5-3.0 cm in diameter (Russo and Vittoria, 2006). These glands open to the lateral wall of the vestibule about 2.5 cm caudal to the vagina by a single duct (Roberts 1971). The occlusive lesions of the ducts of Bartholin's glands lead to the formation of retention cysts and are usually mistaken for vaginal prolapse (Selvaraju *et al.*, 2010, Manokaran *et al.*, 2014). The present case report describes the successful treatment of unilateral Bartholin cysts in crossbred jersey cows.

Case history & clinical findings

Case 1: A 4-year-old crossbred jersey with a history of repeat breeding was presented to ICD Center Gulabbagh. On physical examination, the animal was healthy, active and in good body score condition. On conducting per-rectal examination, doughy mass fluctuating on palpation was appreciated. On clinical examination of the vaginal prolapsed mass, a round thin-walled cyst-like structure about 8 cm diameter was found protruding between vulvar lips. The swelling was soft and did not elicit pain on palpation.

Case 2: A 5-year-old crossbred jersey was presented to ICD Gulabbagh with a history of vaginal prolapse during sitting and straining while urinating. Upon clinical examination of the vagina, a round enlargement covered with vaginal mucosa protruding through vulvar lips was noticed (Fig. 1a). The thin-walled fluctuating cyst about 7 cm in diameter was protruding from the left lateral wall of the vagina which showed no pain on palpation. The

animal was in third lactation and had no history of dystocia in the previous calving.

Case 3: A 5-year-old crossbred jersey cow was bought for artificial insemination at subunit Habbak. The cow had a history of repeat breeding by both artificial insemination and natural service. The cow was prepared for artificial insemination but a large, round swelling (approximately 8-9 cm in diameter) was discovered on the left side of her vaginal mucosal wall during the insertion of the AI gun. On palpation the swelling was soft, fluctuating and painless but hindered AI gun insertion and appeared to be vaginal prolapse (Fig. 1b). The animal was in her second lactation and had no history of any injury or dystocia at the time of previous calving.

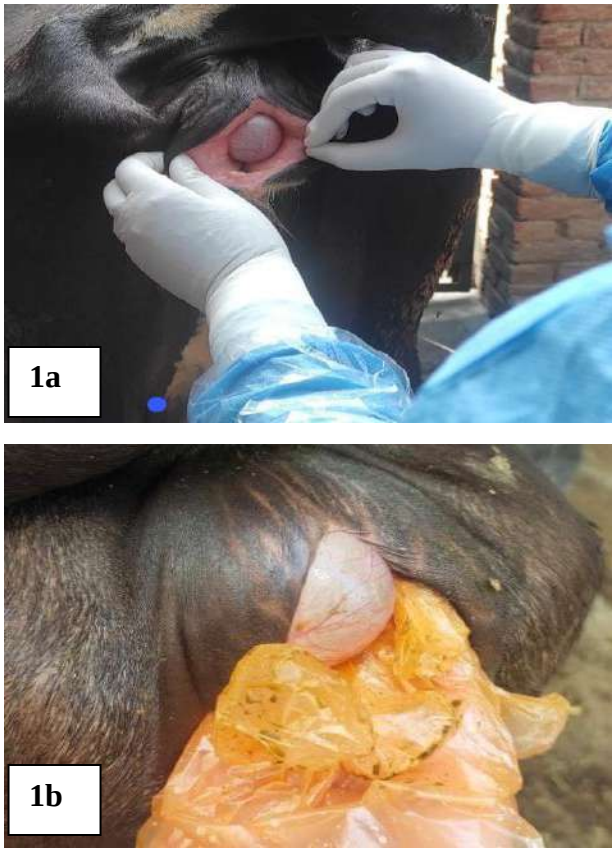

Fig.1a & 1b. *Showing soft thin-walled fluid-filled fluctuating mass protruding through vulvar lips*

Treatment

The animal was restrained with caudal epidural anaesthesia using 2 % lignocaine hydrochloride @ 1mL/100 kg body weight (Kumar S., 2018). The area around the cyst and perineum was washed properly with running water. After cleaning the perineal area, the protruding mass was cleaned with normal saline and povidone-iodine was swabbed on the cyst. The cyst was punctured using a sterile 16 gauge needle and aspirated using a 50ml sterile syringe. The fluid was collected in a graduated glass beaker to access its volume. After complete drainage, about 10 mL of 2% Lugols Iodine was injected into the cyst cavity in cases 1 and 2 to achieve chemical debridement. The cases were followed up telephonically and the condition was completely resolved with no recurrence. Both animals had normal estrus cycles and conceived with AI during subsequent cycles.

However, In case 3, no epidural anaesthesia was given and the cyst was cleaned with normal saline and then povidone-iodine was poured on its surface. The accumulated fluid was aspirated out in a 50 ml syringe with a sterile 16 gauge needle. The fluid collected was approximately 50 ml in volume and was clear without any turbidity. After complete drainage of fluid, the cyst was injected with iodine and flushed out before being treated with Strepto-penicillin antibiotic and the cow was inseminated two hours later.

The volume of about 40–50 mL was collected in all the cases. The fluid was clear, odourless, and mucoid in consistency with no cloudy material. The re-examination was conducted after 10-15 days in the cases and it revealed no recurrence and the animals had an

uneventful recovery. Also, two months after receiving treatment and artificial insemination, the cow (case 3) was confirmed to be pregnant.

Discussion

Cysts in the vestibular gland are mostly reported in humans but have also been found in cows (Sosnik *et al.*, 2007, Drivers and Peek, 2008; Badmekiran *et al.*, 2009). They are generally unilateral and occur in older cows (Roberts 1971). Retention cysts have been reported mostly in cows with a history of injury at the time of parturition (Fathella *et al.*, 2000). Another cause of Bartholin's gland cyst formation in cows is occlusion of the gland duct due to hyperestrogenism that leads to metaplasia of duct epithelium. As stated by Roberts (1971), the cysts cause no problem with conception and parturition. However, it may interfere with AI gun insertion as was found in case-3.

In conclusion, the cysts were unilateral and distorted the shape of the external genitalia. Although the cows recovered successfully, the exact cause of the cyst was not identified. The exploratory puncture, draining, and infusion with antibiotic solution helped in an uneventful recovery and conception of the cow.

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A Brief Review on Lumpy Skin Disease in Kashmir Valley

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Abstract

Lumpy skin disease (LSD) is a transboundary viral disease of cattle caused by the Lumpy skin disease Virus (LSDV) under the family Poxviridae. Initially endemic in African countries, the disease has now spread to other countries of the world including India. Outbreaks of the disease have been reported from UT of Jammu & Kashmir in 2022. The distribution of the epicentres and clinical cases was not uniform, indicating vector-borne transmission of the disease. Stall-fed cattle were more severely affected than free-range and migratory cattle, indicating the need for further investigation. The important clinical signs observed in this study were fever, inappetence, drop in milk yield, the appearance of characteristic skin nodules and in severe cases leg edema and recumbency. Symptomatic treatment and mass vaccination have been effective in controlling the disease. The role of potential arthropod vectors such as Tabanus species needs to be explored further, along with wound management in severe cases. A proper strategy focusing on diagnosis, sampling and vaccination is essential for the prevention of future outbreaks.

Introduction

Lumpy Skin Disease (LSD) is caused by the lumpy skin disease Virus (LSDV) under the family Poxviridae and genus Capripoxvirus. LSDV is a double-stranded DNA virus enveloped by a lipid bilayer. This genus also includes Sheep pox virus and Goat pox virus which are genetically 96 % identical with the LSDV (Tulman *et al.*, 2002).

LSDV has a narrow host range and does not cause natural infection in non-ruminants. It mainly infects cattle and water buffaloes. No clinical cases in sheep and goats have been reported so far from any part of the world, although experimental infections have been documented in these species (Namazi & Khodakaram, 2021).

Lumpy skin disease (LSD) is a highly infectious, notifiable and emerging viral disease of cattle and water buffalo. First recorded from Zambia in 1929, the disease has now spread to most of the world including India which reported its first LSD outbreak in August 2019 in Odisha (Sudhakar *et al.*, 2020). The UT of Jammu & Kashmir was free from

LSD until the first cases appeared in August 2022 from the twin villages of Gugloosa and Shumnag located in the block Tregham of the border district of Kupwara (Kashmir Reader, 2023) and then the disease spread to the whole valley within a span of few months. As per the report, more than 72,000 cattle have been affected by LSD in the UT till November 2022, with a recovery rate of 90% and an average fatality rate of around 4% (Greater Kashmir, 2022).

Risk factors

1. Cattle of all age groups are affected, but young calves and dairy cows in peak production are more severely affected by this disease (Shen et al., 2011).

2. Exotic and cross-bred cattle are more susceptible to the disease than the local cattle (Bos indicus) which can be attributed to factors like skin thickness, and resistance to vector-borne diseases (OIE, 2017).

3. Poor bio-security practices and managemental conditions like housing, and nutrition aggravate the disease severity (Alemayehu et al., 2015).

4. Disease is severe in the spring and summer months as it correlates with the peak breeding season of vectors (Sprygin et al., 2019).

Transmission

The main route of transmission is via blood-feeding arthropod vectors (MacLachlan & Dubovi, 2011). At present, this route is considered to be the most effective and well-established mode of transmission for which conclusive proof is available (Sprygin *et al*., 2019). This route is responsible for short distance spread of the disease, rapid expansion and extensive epidemics while long-distance dispersal of disease to infection-free areas occurs mainly through the movement of infected animals.

Skin lesions of infected animals are the main source of infection as the virus survives in these lesions or scabs for longer periods, even up to several months. The virus is also present in the blood, nasal and lacrimal secretions, saliva, semen and milk (Hamid, 2016; Namazi & Khodakaram, 2021). Viraemia in LSD may last up to 2 weeks and such animals can transmit the infection to the susceptible ones (Tuppuraine *et al*., 2017). LSDV may be transmitted to suckling calves through infected milk (Tuppurainen *et al*., 2017; Bedekovic *et al.*, 2018). Experimental and field trials reveal the very low significance of direct virus transmission, at least in the early phase of the disease (Magori-Cohen *et al*., 2012). The disease can also spread iatrogenically through the use of infected needles during treatment and mass vaccination. Some studies even suggest that ticks act as reservoirs for the virus (Kahana-Sutin *et al*., 2017) and the common housefly (Musca domestica), may also play a role in LSDV transmission (Sprygin *et al*., 2019).

Clinical manifestation & observation

The incubation period of LSD varies from 7 to 14 days in experimentally infected cattle and between 2 to 5 weeks in naturally infected animals (Tuppuraine *et al*., 2005). A total of 400 cattle were examined during the current outbreak of LSD since August 2022 from different villages of Nagam, Chadoora; Zoogokharein, Budgam and Rajpora, Baramulla. LSDV causes mild to severe disease in cattle with symptoms varying from region to region and animal to animal. During

the initial phase of the outbreak, clinical signs of disease observed in the field included mild fever, inappetence, drop in milk yield and appearance of characteristic firm, slightly raised, circumscribed skin nodules mainly covering the neck, legs and back and in severe case whole body (Fig. 1).

Fig.1. *Characteristic LSD skin nodules*

However as the disease progressed during the later phase of the outbreak, the symptoms changed drastically and mainly swelling of the brisket, umbilicus and one or more legs was observed (Fig. 2). Affected animals exhibited lameness, emaciation, anorexia and recumbency in a few cases. Regional lymph nodes become enlarged and generalised lymphadenitis, and oedema was observed. The appearance of nodules was less prominent in this phase. Disease in the majority of cases was typically characterised by pyrexia (104 to 106.5º F) that persisted for several days despite administration of routinely used antipyretic drugs like meloxicam, tolfenamic acid, ketoprofen and flunixin etc. As the disease advanced, the external skin nodules became necrotic and ulcerative. Secondary bacterial infection of these wounds retarded the healing and recovery. During this phase, a significant increase in mortality rate was observed which can be attributed to secondary bacterial infections leading to pneumonia.

Fig.2. *Limb edema resulting in skin erosions*

The other complications of the disease observed were mastitis, myiasis and keratitis. Animals which recovered from disease needed a long time (2 to 4 months) to get back to their body condition, however, infertility remained for a much longer duration

The facility for confirmation of LSDV from the animals showing clinical signs of the disease was made available by the state Animal Husbandry Department at the Institute of Animal Health and Biological Products (IAH & BP) Zakura where they did not only confirmed the disease but for the very first time successfully sequenced the full genome of the virus (Kashmir Reader, 2023).

Discussion & conclusion

A lumpy Skin Disease outbreak was recorded in the Kashmir valley for the first time in August 2022 from the border district of Kupwara. Two clinical forms of the disease were observed- initially a mild form and as the disease progressed a severe form emerged. The distribution of the epicentres and clinical cases was not uniform. It was observed that healthy animals placed with LSD-infected animals in

common insect-proof cattle shed invariably remained healthy in most cases pointing to vector-borne transmission as the major route of transmission of the disease as in concordance with the study reported by Magori-Cohen *et al*., 2012. Most outbreaks in different countries have occurred during the summer months (Kahana-Sutin *et al*., 2017; Sprygin *et al*., 2018) and the incidence of the disease decreased during the cold season (Al-Salihi & Hassan, 2015). The same trend was observed In the present study. The peak incidence of the disease was recorded during the summer months from August 2022 till mid-October 2022 when the potential vector population was high and afterwards, there has been a significant decrease in the number of active cases. To date, studies for most likely arthropod vectors involved in LSDV transmission have been done for the southern hemisphere only and for other geographical areas vector species are poorly characterised. No study is yet available about the vector species involved in the LSDV transmission in the valley. The study by Sohier *et al* demonstrated that *Haematopota* spp. (horseflies) can mechanically transmit the LSD virus (Sohier *et al*., 2019). An abundance of Tabanus species here during the summer months (Maity *et al*., 2015; Tramboo *et al*., 2019) and its feeding habits make it a potential vector for LSDV transmission. However, this needs in-depth investigation and experimental proof. Currently, the means of transmission are uncertain. Elucidation of exact transmission modes and vectors involved could significantly help in the control and eradication of the disease. In this study, it has been observed that stall-fed cattle were more severely affected than free-range and migratory cattle. This may be due to the difference in immune response, production status and associated risk factors; as the severity of the clinical disease is often influenced by the immune status and production level (Venter, *et al*., 2017). However, this observation needs to be further investigated.

Mild cases responded favourably to the symptomatic treatment. Immunostimulants, multivitamins and anti-stress formulations accelerated the recovery process. Role of drugs like corticosteroids, especially dexamethasone and methylene blue need to be further studied in the management of severe cases. In some studies, using 10% oxytetracycline and dexamethasone together showed promising results (Feyisa, 2018).

Wound management in LSD cases is challenging and there is delayed recovery due to secondary bacterial infections and self-licking of the wound by the animal. Washing the wounds with normal saline, use of colloidal silver-containing ointments and multilayer bandaging proved effective in wound management. However, continuous use of antiseptic solutions on the wound seems to delay the healing process. The recovered animals were generally debilitated and there is a drastic reduction in milk yield. Providing balanced feed and supplements helped in quick recovery.

The most effective method to control the disease is mass vaccination of the susceptible cattle along with movement restriction, quarantine and segregation of the affected animals (Sevik & Dogan, 2017). The carpet vaccination drive run by the state Animal Husbandry Department, in which 8.70 lakh vaccine doses were administered across the valley, played an important role in the

control and containment of the disease (Kashmir Images, 2022). However to avoid future outbreaks proper strategy focusing on diagnosis, sampling and vaccination should be put in place.

In conclusion, the LSD outbreak in the Kashmir valley in 2022 has highlighted the importance of understanding the transmission modes and vectors involved in the disease. The role of potential arthropod vectors such as Tabanus species needs to be explored further to aid in disease control. Stall-fed cattle appear to be more severely affected than free-range and migratory cattle, indicating a need for further investigation. Treatment of mild cases with symptomatic management in combination with immunostimulants has shown positive results, while wound management in severe cases remains challenging. Mass vaccination, movement restriction, quarantine and segregation of affected animals have been effective in controlling the disease. A proper strategy focusing on diagnosis, sampling and vaccination is essential for the prevention of future outbreaks.

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J&K Veterinary Doctors' Association

Effect of Disinfectant on Total Viable Count of Water used in Poultry

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Colony forming unit;
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Abstract

Drinking water having the permissible microbial load is crucial for healthy poultry production. This study assessed the bacterial quality of the disinfectant Olklin-SW (Virbac Animal Health) treated water used in poultry by comparing the total viable count (TVC) of untreated and treated water. The average total viable count of untreated water was $1x10^5$ CFU/mL. Subsequently, the treatment of water with the disinfectant at the rate of 1 mg/mL or 1 g/L reduced the total viable count drastically to almost nil.

Introduction

Water is the most abundant chemical substance on earth. Water quality parameters have a direct or indirect influence on the performance of poultry birds. Poor water quality with higher bacterial load, minerals, and other pollutants can have deleterious effects on the normal physiology of birds resulting in decreased production. Drinking water with a higher microbial load causes transmission of bacterial, viral, and protozoan infections. Drinking water with good quality is crucial to maintain healthy gut flora and helping birds absorb the essential nutrients from the feed (Manwar *et al*., 2012). In poultry production, water provided to birds should be of a good microbial standard to minimize possible microbial hazards. Various preventive and control measures must be taken to decrease the occurrence of diseases that are spread via water. Accordingly, the objective of this paper was to determine the bacterial quality of water, and consequently the effect of the addition of disinfectant on bacterial load.

Materials & Methods

The study was conducted at the Disease Investigation Laboratory (Srinagar), Department of Animal Husbandry. The materials required were sterile-autoclaved distilled water as a diluent, Olklin-SW (Virbac Animal Health) as a disinfectant and Nutrient Agar (ReadyMED^{TM}) for the enumeration of colony-forming units/mL of water used in poultry by the Total Plate Count/Total Viable Count/Total Microbial Count method. The active ingredients in Olklin-SW (Virbac Animal Health) are Salt containing Potassium monopersulphate/ Potassium hydrogen sulphate/ Potassium sulphate and Sodium chloride. Tenfold serial dilution (10^{-1} to 10^{-5}) of the water sample was done using sterile-autoclaved distilled water as a diluent. Using the spread plate technique, all the dilutions were poured on the nutrient agar media and run in duplicates. The agar plates were then incubated at @ 37 ^oC for 48 hours. The agar

plate with 25-250 colonies was used for the estimation of Total Viable Count (TVC) determined by the following formula (Maturin & Peeler, 2001):

$$TVC\,(CFU/ml) = \frac{C_1 + C_2}{(1 \times n_1) + (0.1 \times n_2) \times d}$$

C_1 = Colony Count of 1st dilution with 25-250 colonies

C_2 = Colony Count of 2nd dilution with 25-250 colonies

n_1 = No. of plates from 1st dilution with 25-250 colonies

n_2 = No. of plates from 2nd dilution with 25-250 colonies

d= Dilution from which counts (25-250 colonies) were obtained

The same water samples were then treated with Olklin-SW (Virbac Animal Health) @ 1 mg/mL. The TVC was estimated in the same way as an untreated water sample.

Results and Discussion

Water quality is an important factor in poultry production. The physio-chemical and microbiological qualities of drinking water should be within the maximum permissible level for the efficient performance of poultry birds. Poor quality of water leads to higher mortality and hinders the performance of the birds, in terms of body weight gain or egg number. In the present study, the average values of TVC (CFU/mL) of untreated water samples were $1x10^5$ CFU/mL. The colony count was 'too low to count' in dilutions from Olklin-SW (Virbac Animal Health) treated water samples. The TVC is the measure of the total number of live bacteria in a water sample. Due to the treatment of water samples with Olklin-SW (Virbac Animal Health), the overall TVC of bacteria decreased. In support of the present findings, Sanghamitra Kalita *et al*., (2020) also reported similar findings. The treatment of water samples with the disinfectant greatly reduced the total bacterial count which is in agreement with the study of Das (2013) as well.

Conclusion

The treatment of water with Olklin-SW (Virbac Animal Health) @ 1 mg/mL or 1 g/L of water decreases the microbial load in water effectively and is useful for poultry production.

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Post-LSD Lactolithiasis - A Case Series describing Treatment Approaches

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Udder;
Mosquito artery forcep.

Abstract

Eight cows were observed during field visits with medium-sized lactoliths (milk stones) in their teat canals. The medicinal treatment with udder pH regulators could not prove helpful in the dissolution of stones and hence teat siphon, mosquito artery forcep and teat tumour extractor were employed for the removal of stones. Mosquito artery forcep along with teat siphon proved useful in the process of stone removal via teat orifice with minimal trauma.

Introduction

The Lumpy Skin Disease (LSD) outbreak that affected various parts of India including J&K UT came with various challenges and lactolith was one of them as observed by the field veterinarians. Lactolith/Milk stones are formed when solidification of milk occurs in the milk rich in minerals particularly calcium and due to supersaturation of salts (Dass *et al.,* 1985; Kersjes *et al.,* 1985). The stone descends into the teat canal and causes a blockade of milk. If not treated in time, the blocked teat leads to the drying of the quarter of the udder.

Case history

Eight cows of different age groups ranging from 4 to 7 years were observed during field visits in Kralpora and Ramhal belts of District Kupwara of J&K UT. Each of the cows was presented with the history of blockade of milk flow after recovery from LSD. Clinical examination revealed a seed-like structure in one or more teats, coming at the tip of the teat canal and obstructing the milk flow.

Treatment and follow-up

The cases were initially prescribed udder pH regulators (combination of trisodium citrate, sulphates of calcium, cobalt, manganese & zinc, potassium iodide and lactic acid bacilli) for balancing the pH of the udder with no significant results. The removal of the stones was performed by use of straight mosquito artery forceps and teat siphon through the opening of the teat canal without giving any incision (Fig. 1) (Divers & Garry, 1998). A teat tumour extractor was also applied in some cases which caused a bit of trauma to the teat and its use was discontinued. Straight mosquito artery forceps proved very delicate on the teat due to the nature of their size and grip.

Fig.1. *Showing lactoliths and their removal with mosquito artery forcep & teat siphon*

Six cows recovered successfully while the affected quarters of two cows who had not received treatment at an early stage dried off. To prevent further recurrence of the stones, the cases were put on udder pH regulators and balanced calcium-phosphorus supplements with very good results.

Discussion

The occurrence of lactoliths has significantly increased post-LSD and cases are being reported from different areas of Kashmir, J&K. Lactoliths, if left unattended can ultimately lead to permanent drying of affected quarters of the udder and hence prove detrimental and loss of elite dairy animal value to the condition described in this report i.e, lactoliths. Smaller lactoliths may get washed out with a flow of milk, and moderately bigger stones can be taken out by the use of mosquito artery forceps some of which may need prior crushing of stone by the forceps first. A bigger lactolith which cannot pass through the teat orifice may need surgical invention as the teat opening can expand only to a certain level (Sahoo *et al.,* 2016). Incorporation of balanced oral calcium and phosphorus and udder pH regulators in diet prevents supersaturation of salts and formation of lactoliths especially in LSD affected udder.

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Surgical Management of Umbilical Hernias in Crossbred Calves under Field Conditions

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Calves;
Umbilical hernia;
Herniorraphy;
Vest over pant suture
Extension.

Abstract

A total of 13 crossbred Holstein Friesian and Jersey calves were treated for a congenital hernia over a period from February 2020 to June 2022. The physical examination revealed a distinct hernial ring at the point of umbilicus with no visible adhesions in 12 cases. Under local anaesthetic (2% lignocaine hydrochloride), open herniorrhaphy was performed in 12 cases with overlapping suture patterns. While closed herniorrhaphy was performed in 01 case of a female calf. All cases showed uneventful recovery except one case which developed abscess with adhesions and recovery was prolonged.

Introduction

When an organ or a tissue displaces or protrudes out of the abdominal cavity with an intact peritoneal layer through a natural or an abnormal opening, the hernia is formed (Alkhilani, 2019). Protrusion of abdominal contents through a break of the abdominal wall at the site of the umbilicus is known as an umbilical hernia (Iqbal *et al.*, 2019). The type of hernia where the contents can be restituted to their original position is known as a reducible hernia while in a non-reducible hernia, the mass cannot be pushed back (Alkhilani, 2019). Hernia may be present from birth (congenital) or may be acquired during the lifetime (Alkhilani, 2019). Failure of normal closure of the umbilical ring or hypoplasia of abdominal muscles leads to the formation of an umbilical hernia in a calf (Haile *et al.*, 2017). Reduction in gestation length and multiple births are the most common cause of congenital umbilical hernia in calves (Haile *et al.*, 2017). The cause of acquired hernia may be attributed to mal-handling at the time of birth, traumatic deep wound, an abscess, increased intra-abdominal pressure, weak abdominal wall, strenuous exercise etc. (Greber *et al.*, 2013). Palpation, clinical observation and ultrasonography are diagnostic methods for hernia (Iqbal *et al.*, 2019). Hernia of 1 cm size usually resolves on its own. However, comparatively larger hernias need intervention. Small uncomplicated hernias can be corrected by non-surgical methods by using bandages, clamps or bands or by irritating the umbilical ring on a daily basis or by closed herniorrhaphy (Iqbal *et al.*, 2019). Large hernias (more than 3-4 cm), on the other hand, require surgical manipulation by a method known as open Herniorraphy (Iqbal *et al.*, 2019).

Case presentations & Treatment

A total of 13 cases were considered for this study and were selected based on the follow-up reports. Those cases of umbilical hernia that lacked follow-up due to non-traceability were not considered in the present study (Fig. 1).

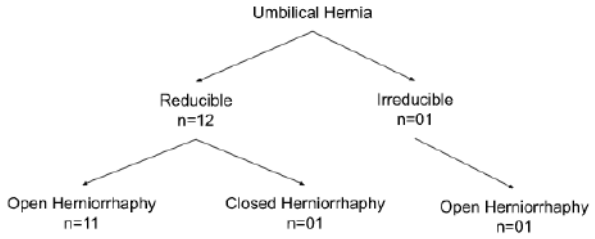

Fig.1. *Flow chart representing the number of cases included in this study*

Animals were restrained in lateral recumbency and the site of interest (point of the umbilicus) was shaved and proper asepsis was maintained in all the cases throughout the procedure. Linear local infiltration with 2% lignocaine hydrochloride was administered to carry out the surgery. Twelve Cases were classified as reducible in nature while 01 was irreducible. Around 30 minutes prior to start of surgical procedure, the animals were given analgesics (Meloxicam @ 0.2-0.3 mg/kg, IM and antibiotic (ceftriaxone @ 10 mg/kg, IV). In all 11 cases (reducible hernias), an elliptical skin incision was made and all the contents were repositioned back into the abdomen and utmost care was taken not to puncture any of the visceral organs. In one case (non-reducible hernia), contents were freed from all the adhesions and then pushed back into the abdomen. Rent was closed by vest-over-pant suture pattern with absorbable suture material (Chromic catgut no. 2). Muscle suturing was done in a routine double-layer technique by absorbable suture material in an interlocking manner and skin was sutured afterwards. Post-operative care with proper analgesics and antibiotics was kept for 3 days. Skin sutures were removed after 12 days in each case. Owners were advised to give a laxative diet for one week and reduce heavy exercise for 10 days. All cases showed uneventful recovery with pus in one of the cases together with adhesions which showed delayed recovery than those with no adhesions.

Fig.2. *Umbilical hernia treated surgically by open herniorrhaphy*

Discussion

An umbilical hernia is a common condition observed in dairy calves, caused by the incomplete closure of the umbilical ring (Alkhilani, 2019). An umbilical hernia is an external type of hernia and requires a differential diagnosis from a cyst, hematoma, abscess, urethral rupture (males) and neoplasm

(Mohammed & Roessler, 2018). Besides umbilical remnants, C-section is another predisposing factor for the development of umbilical hernia in calves. Based on proper diagnosis and clinical examination of the type, size and complications of hernia, the line of treatment is decided. In the case of a large complicated hernia, herniorrhaphy and good post-operative care result in successful management and recovery. While the hernial ring with a size of fewer than three fingers was treated with closed herniorrhaphy.

The present study reports 12 cases of reducible and one case of irreducible hernia. The authors used local anaesthesia, followed by pre-operative analgesics and antibiotics, to ensure a pain-free and infection-free surgical procedure. All cases were managed by repositioning the herniated content back into the abdomen and repairing the defect by vest-over-pant suture pattern, followed by post-operative care for three days. The authors reported successful outcomes in all cases, with one case showing delayed recovery due to adhesions.

Conclusion

In conclusion, an umbilical hernia can be effectively managed by a routine surgical procedure with proper attention to anaesthesia, pain management, and infection control, leading to an uneventful recovery in most cases. The findings of this study also showed a gender difference, with female calves having a greater frequency of umbilical hernia than male calves.

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Deworming Awareness in Low-lying and Marshy Areas of Kashmir Valley: A Questionnaire Survey

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Abstract

A survey was conducted among breeders in low-lying and marshy areas of Kashmir Valley to investigate their understanding of parasitic diseases and dosing practices. The survey utilised a predesigned questionnaire to examine factors such as dosing frequency and season, awareness of parasitic diseases, and extension activities provided by development departments during 2016. Results showed that breeders were generally aware of the need for regular dosing but lacked detailed knowledge of dosing schedules. Further education is needed to improve their understanding of proper dosing practices. The developmental departments continue to be the primary source of both inputs and services, especially in low-lying and marshy areas.

Introduction

Gastrointestinal parasitism constitutes one of the major health problems limiting the productivity of animals in the Himalayan and other hilly regions of India (Mandal *et al.*, 2021, Bhat *et al.*, 2012). Health threats and losses to the productivity of livestock are due to the associated morbidity, mortality, cost of treatment and control measures (Salim *et al.*, 2019). The prevalence of helminths of small ruminants results in low productivity due to stunted growth, poor weight gain and poor feed utilisation (Pedreira *et al.*, 2006). Helminthiasis adversely affects ruminants causing haematological, and biochemical disturbances, anorexia, weight loss, poor reproductive performance, and even the death of lambs (Salim *et al.*, 2019).

Gastrointestinal parasitism is a key concern in the development of the livestock sector. The line departments have taken up extensive extension campaigns for deworming especially in low-lying and marshy areas where dreaded fasciolosis has been a key contributor to mortality. In fact, deworming strategies were oriented to control fasciolosis to a great extent. In order to fully understand the dissemination and effects of veterinary extension efforts, it is crucial to conduct research. Therefore, this study was undertaken to assess the reach and influence of extension activities among breeders in seven regions located in low-lying and marshy areas of the Kashmir valley.

Methodology

In this study, respondents/breeders were chosen from low-lying and marshy areas

of Kashmir Valley (Fig. 1) and were interviewed about deworming awareness. The responses were recorded on a predesigned questionnaire based on parameters like frequency and season of dosing, awareness of parasitic diseases in their animals and perception regarding the role of extension activities of the line departments. As many as 50 breeders/respondents from seven select areas representing one-third of mapped marshy/low-lying areas were chosen randomly on the basis of recommendations by local veterinarians and ease of access to interview.

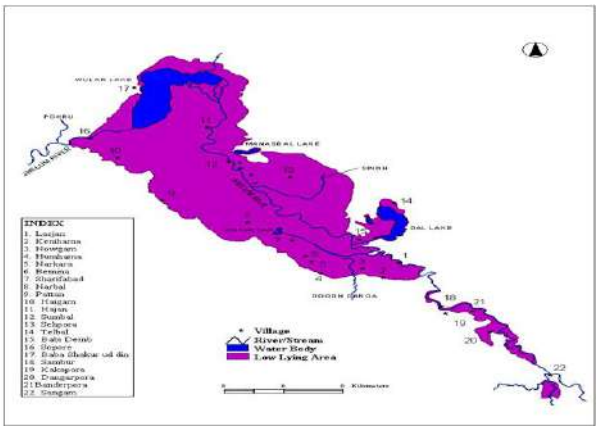

Fig.1. *Map of the study area (courtesy: Department of Geography University of Kashmir)*

Results & Discussion

Awareness about periodical dosing appears to be quite high without precise knowledge of the dosing calendar (Table 1). Sheep breeders hardly reported summer dosing because it is either covered under the need-based regimen of livestock, especially small ruminants who most often spend summers at highland pastures for grazing. Wide acknowledgement of the services rendered by the Department of sheep husbandry to breeders was noteworthy. Very few breeders reported about morbidity and mortality from parasitic diseases (Table 1). This could be attributed mostly either to a lack of awareness about parasitic infestation though in some cases it might reflect the ground reality of significant control achieved through adherence to departmental advisories regarding the deworming schedule. Most respondents considered spring as the season of disease occurrence which may be explained by overcoming post-winter hypobiosis. Under field conditions, grass poisonings and diarrhoea encountered in spring are sometimes confused with parasitism, which needs to be ruled out by dung sample testing. The line departments continue to be the primary source of both inputs and services. Drugs are made available and there is a door-to-door campaign by the Department of Sheep Husbandry for ensuring mass dosing. There is a separate wing for liver fluke control in the Department of Animal Husbandry that provides drugs and services.

The data obtained is validated by observations of vets and a number of publications showing fasciolosis has been greatly controlled. This is a validation of the results showing the success of extension and deworming campaigns. This shouldn't however be construed as a licence to lax vigil and we need to equally focus on deworming against nematodes. It was also observed that animals are generally well nourished, even during winters under stall feeding. And it is well known that well-nourished animals cope better and overcome infection with parasites quicker than mal-nourished ones (Bath *et al.*, 2016). Our findings regarding the lesser degree of encounter with parasitic diseases by farmers or lesser morbidity or mortality figures for all the parasites recorded in this study reflect not

only more attention to dosings but also more attention to housing, hygiene, feeding and other managemental inputs. Recently there has been a shift in the traditional practice of livestock farming and now it is no longer restricted to the destitute and marginalized class(s). Most of the owners interviewed had sizable populations of sheep (>20) reflecting more conscious farmers who adopt sheep farming not only to supplement their livelihood but for more ambitious entrepreneurship. People are more ready to purchase quality medicine from the private market and this also shows a certain heightened awareness regarding the costs and benefits of livestock rearing and the adoption of scientific managemental practices to ward off parasitism.

Conclusion

There has been a noticeable increase in livestock farmer's awareness of the risks of parasitic infection and adoption of their preventative measures, as indicated by hyper-awareness. Some farmers reported administering more than the recommended number of deworming treatments per year. However, it is important to note that further systematic research over extended periods of time, particularly in areas with high rates of parasitic infection, is necessary which was beyond the scope of the present study.

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J&K Veterinary Doctors' Association

Conjoined twin calves: A Case of Monocephalus Thoracopagus Tetrabrachius Tetrapus Dicaudatus Fetal Monster

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Conjoined twins; Monocephalus Thoracopagus Tetrabrachius Tetrapus Dicaudatus; Fetal monster

Abstract

A 5 year old cross bred jersey cow in its 2nd lactation with the history of natural mating was presented with prolonged second stage labour. After unsuccessful attempts to deliver the calf, cesarean section was performed and a fetal monster was recovered. The condition of the calf could be classified as monocephalus thoracopagus tetrabrachius tetrapus dicaudatus fetal monster. The cow recovered uneventfully.

Introduction

Disturbance in the development of different organ systems leading to the formation of a distorted individual is known as monstrosity (Vegad, 2007). The monstrosities have been associated with either infectious diseases or congenital defects (Arthur *et al.*, 2001) resulting in defective individuals and thus interfering with normal birth of the offspring.Twinning or multiple births have been occurring in uniparous mammals and among the farm animals the incidence of conjoined twins and monsters has been found to be higher in cattle (Arthur, 1956;Leipold 1972).The fetal monstrosities in bovines commonly result in dystocia due to duplicated body parts and increased number of limbs (Shukla *et al.*, 2007). The present communication documents a rare congenital condition of a fetus.

Case history and clinical observations

A 5 year old cross bred jersey cow in its 2nd lactation with the history of natural mating was presented with prolonged second stage labour and extreme abdominal contractions. The cow had been manipulated by local paraveterinarians without any success. On clinical examination two hindlimbs and a tail were seen protruding through the vulva. Pervaginal examination revealed another tail and two hindlimbs within the uterus, and the head of fetus was inaccessible. Every attempt was made to deliver the fetus however the animal could not be relieved. The dam was recumbent and restlessand it was decided to go for cesarean section for delivery of the calf.

Treatment and Discussion

An oblique ventrolateral laparohysterotomyincision was given on left side of the cow under local anesthesia by using 2 % Lignocaine hydrochloride and a full term dead fetal monster was retrieved. The cow recovered uneventfully and was treated with an injectable antibiotic Enrofloxain(5 mg/kg b.wt)

for 5 days and an injection of Meloxicam (0.5 mg/ kg b.wt) for 3 days. Daily antiseptic dressing of the sutures was done with povidone iodine solution. The sutures were removed ten days after the cesarean section.The retrieved phenotypically male conjoined twins had a single head (monocephalic) with two muzzles and two oral cavities (Fig. 1&2). The head carried two normal ears and two fully developed eyes on either side with a centrally located vestigial eye lined with hairs. The necks were fused alongwith the fused thoracic regions (thoracopagus). The moster had four forelimbs (tetrabrachius), four hindlimbs (tetrapus) and two distinct tails (dicaudatus) (Fig. 3). The present condition of the monster can be classified as a monocephalusthoracopagustetrabrachiustetrapusdicaudatus twin monster (Roberts, 2004).

Fig.1. *Fetus showing fused muzzels and oral cavities*

Occurrence of conjoined twins could be correlated to a number of factors influenced by genetic and environmental conditions including prenatal infection with a virus, ingestion of poisonous and teratogenic substances by the dam, vitamin A and folic acid deficiencies (Sharma et al., 2010). These factors collectively lead to the failure of twins to separate after the 13th day of fertilization (Srivastavaet al., 2008). It has been observed that the twins will share body parts in addition to sharing their chorion and amnion if the split occurs after 13th day of fertilization (Finberg et al., 1994). It has also been reported that the conjoined twins are always genetically identical and share the same sex (Simon et al., 2009), which correlates with the current case owing to same sex of the twins. In the current case the condition couldn't be hereditary as the dam had delivered a normal fetus in her first parity.

Fig.2. *Conjoined twins with a single head*

Fig.3. *Conjoined twins with fused thoracic regions and extra limbs*

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Surgical Management of an Abscess in a Dairy Buffalo – A case report

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Abscess;
Buffalo;
Subcutaneocentesis;
Surgical management

Abstract

The presence of pus can cause the formation of an abscess - a pocket of pus that is contained within the surrounding tissue by fibrous or granulation tissue. A female crossbred Murrah buffalo in the fifth lactation was presented with a history of a large hanging integumentary mass at the lateral region of the left hind limb below the hock joint. The mass was warm, firm and painful upon palpation, but weight bearing on the limb was normal. The case was diagnosed as a subcutaneous abscess on the basis of history, clinical examination and subcutaneocentesis. The abscess was drained surgically and the cavity was irrigated with povidone-iodine. Povidone iodine-impregnated gauze was inserted to promote drainage and prevent the wound from closing. The buffalo received an antibiotic, antihistaminic, NSAID and fly-repellent treatment regimen for 5 days. The buffalo recovered without any further complications within a period of two weeks.

Introduction

An abscess may be defined as a purulent exudate-filled cavity encompassed by a pyogenic membrane (Tyagi and Singh, 2012). An abscess can develop within (internal) or outside (external) the body (Alharbi and Mahmoud, 2012). Depending upon their anatomical location, different abscesses are called pharyngeal, pulmonary, hepatic, submandibular, cerebral and subcutaneous abscesses (Constable *et al.*, 2017). Skin abscess commonly develops on the head, neck, chest, abdomen and limbs as a consequence of injury, foreign body penetration, use of contaminated needles for injection and poor management practices (Al-Harbi, 2011). Tenderness, pain, warmth, redness and swelling are typical symptoms of subcutaneous abscess (Abdel-Hady *et al.*, 2015). The swelling may be hard or soft depending upon the state of maturation of the abscess. An aseptic exploratory puncture is always required to differentiate a superficial abscess from other types of swellings. The aspiration reveals blood in hematoma, serous fluid in cysts, synovial fluid in bursitis, and nothing or intestinal content in the hernia (Hassan *et al.*, 2019). The present case report describes a case of subcutaneous abscess in a crossbred Murrah buffalo and its surgical management.

Case history and clinical observations

A female crossbred Murrah buffalo in fifth lactation was presented at Integrated

Cattle Development Center, Kati-Wangath, Kangan, Ganderbal with a complaint of a gradual increase of mass below the hock joint of the left hind limb (Fig. 1). Clinical history revealed the buffalo had a traumatic injury during transportation a few months back in the same limb. On clinical examination, all physiological parameters of the buffalo were in a normal range and the mass was semi-soft to soft in consistency, warm and painful upon palpation. Aspiration of the contents of swollen mass was done to differentiate it from a tumour, hematoma, hernia, cyst etc., which revealed a creamy discharge. Based on clinical history, clinical examination and centesis, the case was diagnosed as a subcutaneous abscess. In order to relieve the patient from the condition, surgical intervention for complete drainage of pus was decided.

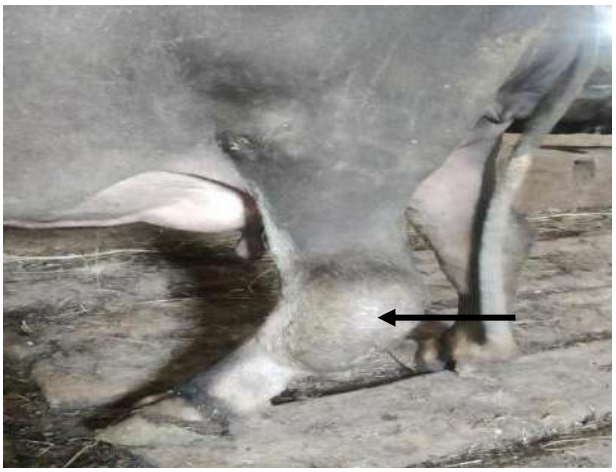

Fig.1. *Arrow pointing to the subcutaneous abscess near hock joint*

Clinical management and treatment

The surgical site was made sterile by clipping, shaving and washing with a solution of water and 10% povidone-iodine. The buffalo was given Intravenous xylazine hydrochloride at a dose of 0.03 mg/kg body weight to induce sedation and was cast in right lateral recumbency with the affected area facing up. Local anaesthesia was administered through the infiltration of 2% lignocaine hydrochloride along the incision site. After sedation of the buffalo, a stab incision was given on the dependent part of a ripened abscess. Approximately one litre of pus was drained (Fig. 2) and the cavity was flushed and packed with gauze soaked in povidone-iodine (5%) with one end protruding out of the incision to allow drainage of pus. A pressure bandage was tied to the affected area.

Fig.2. *Drainage of puss (approx. 1 L)*

The aseptic dressing was performed at 2 days interval with gauze-soaked povidone-iodine (5%). Parenteral antibiotic Strepto-penicillin @ 2 mL/50 kg, intramuscularly daily for 5 days, antihistamine (pheniramine maleate) @ 0.5 mg/kg body weight administered intramuscularly at 24-hour intervals for five days, meloxicam @ 0.2 mg/kg, intramuscularly once a day for 3 days and a topical herbal aerosol spray thrice a day for five days. Restricted movement and soft bedding were also advised. After 2 weeks, the buffalo recovered completely with normal walking and weight bearing on the limb.

Discussion & conclusion

Abscess is a suppurative inflammatory condition caused by bacterial infections especially *Staphylococcus aureus* which gains access to the body through a wound or injury that has punctured or broken the skin. Fungi, viruses, or parasites rarely lead to abscess formation (Misk *et al.*, 2008). Usually, the condition remains localized however metastasis to other body parts via lymph or blood can occur (Constable *et al.*, 2017). Swelling, redness, hot surface and pain just below the hock joint presented the typical signs of a subcutaneous abscess (Hasan *et al.*, 2019).

Diagnosis of subcutaneous abscess can be done by clinical examination however the internal abscess requires exploratory techniques, imaging and ultrasonography examination. Parenteral antimicrobial and daily dressing is required for the complete recovery of patients from subcutaneous abscess (Radostits *et al.*, 2007). Successful surgical management of subcutaneous abscesses can be done at the field level. Proper dressing, parenteral administration of prescribed medications and pressure bandaging can help in productive recovery without recurrence of the condition.

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Surgical Management of Traumatic Udder Laceration under field Conditions in a Cow

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Purulent exudation;
Traumatic udder laceration;
Septal wall.

Abstract

Traumatic udder laceration in a dairy cow was characterised clinically by the appearance of a lacerated wound on the left forequarter of the udder with purulent exudation and maggot infestation. The treatment consisted of surgical removal of the affected quarter and subsequent treatment with antiseptic dressing and post-operative antibiotics.

Introduction

Teat laceration is one of the most common clinical conditions seen in grazing cattle due to barbed wires and agricultural implements (Singh *et al.*, 2012). However the udder lacerations are also reported under field conditions either due to the accidents or infliction by a malicious intent (Singh *et al.*, 2012). The lacerations with subsequent contamination often lead to loss of the affected quarter due to bacterial infections as well as maggot infestation. The current report discusses a case of traumatic udder laceration with purulent exudation and maggot infestation and its surgical management in a cow.

Case history and clinical observations

A seven year old cow with the history of one week old udder laceration (Fig. 1) was reported with purulent exudation and maggot infestation of the left forequarter. Clinical examination revealed that the whole left forequarter had been affected by pus with maggot infestation causing loss of the whole quarter.

Fig.1. *Arrow pointing to the Traumatic laceration of udder*

Surgical management and treatment

Pre-operatively the animal was given dextrose normal saline 500 mL and Ringer lactate 1000 mL intravenously. The animal was

sedated using xylazine @ 0.05mg/kg body weight intramuscularly. The animal was positioned in right lateral recumbency. Analgesia was achieved by local infiltration of 2% lignocaine hydrochloride solution in the septal walls of suspensory ligaments of the affected quarter. Two circular incisions were made around the wound along the inner aspect of the septal walls to detach the whole alveolar tissue of the affected quarter. Whole mammary alveolar tissue was carefully removed by checking bleeding. The evacuated quarter was debrided of left out necrosed tissue and rinsed with antiseptic solution and then sutured to avoid further contamination. Proper drainage was also provided at the dependent part of the quarter. The animal was given antibiotic cover with parentral ceftriaxone and tazobactam, anti-histaminic (pheniramine) and anti-inflammatory (meloxicam) drugs for 5 days with antiseptic dressing of the site. The sutures were removed 14 days post surgical procedure and the animal recovered fully with three healthy producing quarters (Fig. 2).

Fig.2. *Recovered cow with 03 healthy producing quarters*

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Intussusception and its Surgical Management in a Cow – A case report

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Ananstamosis;
Intussusception;
Laparotomy;
Cushing suture.

Abstract

A fourth-parity cow presented with anorexia, cessation of defecation for five days, and rectal mucus with blood traces. Upon rectal examination, a mass was detected near the pelvic brim. In order to conduct further diagnosis in the field setting, an exploratory laparotomy was performed, revealing intussusception of the intestine. Subsequently, surgical intervention was undertaken. The intussusception part was excised and an intestinal anastomosis of viable ends was executed under local anaesthesia, and the animal experienced an uneventful recovery.

Introduction

The term Intussusception refers to the telescoping of one part of the intestine (Intussusceptum) distally into adjacent portions (Intussuscipiens). Although sporadic occurrence in bovines has been documented (Pearson, 1971; Rathore *et al.,* 1977; Kumar *et al.*, 2003) but intussusception is one of the most common causes of complete intestinal obstruction in cattle (Constable *et al.,* 1997; Tyagi and Singh, 1993). The present report describes a successful surgical management of intussusception in a cow under least equipped field conditions.

Case history and clinical symptoms

A cow in her 4th parity was reported with the history of anorexia and cessation of defecation for 5 days. The temperature of the animal was 103.2 ^{0}F. Respiration rate and heart rate were normal. Per rectal examination revealed an empty rectum with dark red blood tinged mucus. The intestines were empty but a hard mass was palpable near the pelvic brim. Based on the history, per rectal examination and exploratory laparotomy, intussusception was diagnosed and surgical intervention was planned.

Surgical management and treatment

The right paralumbar fossa and lower flank were prepared for aseptic surgery and the laparotomy was performed under anterior epidural anesthesia with 2% lignocaine hydrochloride. The mass of intestines located cranioventral to the pelvic brim was exteriorized which appeared sausage-like and one part of the intestine was invaginated into the other part (Fig. 1). The mesentery was dragged along with an invaginated intestinal segment. An attempt was made to reduce the intussusception but the invaginated part appeared necrosed. The necrosed portion was resected and the mesentery was sutured in a continuous pattern with chromic catgut no. 1.

Beveling of one segment was done to achieve a diameter equal to the opposite segment for better apposition. Suturing of the intestine was started at the mesenteric end in schmieden pattern using 2/0 Vicryl. After suturing was completed, the patency of lumen and leakage was checked. First sutured layer was inverted by the second layer in Cushing suture pattern (Fig. 2). The anastomosed area of the intestine was washed with a normal saline solution before repositioning the intestine in the abdominal cavity. The laparotomy incision was closed in routine manner. Postoperatively, the animal was administered broad-spectrum antibiotic ceftriaxone and tazobactam @ 10 mg/kg body weight (IM BID), meloxicam and paracetamol (NSAID) for 5 days. Dextrose (5% DNS) with multivitamins was administered for 3 days. Rumenotoric and Probiotic was also prescribed as a supportive treatment. Antiseptic dressing of the wound was done with 1% povidone-iodine solution daily. Skin sutures were removed on 9th day postoperatively (Fig. 3).

Fig.1. *Arrow pointing to the intussuception*
Fig.2. *Showing intestinal anastamosis*
Fig.3.*Showing recovered cow on 9th post operative day*

Surgical management and treatment

Intussusception usually occurs in jejunum and ileum and rarely in colon. The present report recorded intussusception in the colon. Hyperperistalsis and mechanical causes are considered to be the common factor that leads to intussusception (Pearson and Pinsent, 1977). In the present case the cause could not be established. Anorexia, colic, loss of rumination and the presence of dark red bloody mucus per rectum in otherwise empty bowel are the common symptoms exhibited in intussusception of cattle.

Normal temperature and heart rate, marked reduction in milk yield, bilateral distension of the abdomen, ruminal atony and dehydration have also been reported during intussusception (Sharma, 1997). Intussusception is surgically repaired by means of resection and end-to-end anastomosis (Dabak et al., 2001; Fontaine-Rodgerson and Rodgerson, 2001). Because end-to-end anastomosis causes less chance of stricture and leakage of the surgical site (Constable et al., 1997). This technique was preferred in this case and proved to treat the case successfully. A cow was fasted for at least 24 hours postoperatively before feeding was gradually resumed.

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Postmortem Diagnosis of Strangulated Umbilical Hernia in a Female Angora Rabbit - A case report

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Abstract

A female German Angora rabbit with a history of unexplained sudden death was brought to the clinical section of Angora Rabbit Farm Baramulla Kashmir for postmortem examination. On inspection a slightly red coloured irreducible swelling was observed in the umbilical region. During postmortem examination, a herniated region and part of the jejunal were exposed in the swelling.

Introduction

In new born animals the umbilicus contains urachus and remnants of blood vessels which shrink until a small remnant is left. However, in some cases this opening doesn't close completely, leading to protrusion of abdominal contents through this opening beneath the skin which are visible as a sac from the outside (Priester *et al.*, 1970). Most of the animals with umbilical hernia can live without any life threatening complications, however protrusion of intestinal loop through this opening and its subsequent strangulation can lead to acute illness and death of the animal. Except for a report pertaining to the surgical management of umbilical hernia in a live rabbit from India (Monsang *et al.*, 2014), there is relative scarcity of information on the postmortem findings of laboratory animals with strangulated umbilical hernia. The present communication aims to report postmortem findings of a female German Angora rabbit that died of strangulated umbilical hernia.

Case History & Postmortem

A female German Angora rabbit, aged 1.5 years, weighing 2.6 Kg and found dead in the morning was brought for postmortem to the clinical section of Angora Rabbit Farm Kashmir. The warm body temperature and absence of rigor mortis suggested a recent death.

The animal was laid in the spinal recumbency and the entire body was examined. A slightly red coloured, circular, non-pitting, irreducible swelling, measuring 5.5 cm × 5.0 cm was noticed in the umbilical region. A midline incision was given in the skin starting near the sternum with the help of a surgical blade and extended caudally over the swollen region with surgical scissors (Fig. 1). The

swelling was opened completely and the contents were properly examined for identification on the basis of color, contents, shape, size and relation to the surrounding tissues.

Fig. 1. *Incising the hernial sac to expose the contents*

Observations

The hernial sac was made up of peritoneum on the internal side and the hernia ring was formed by a small opening communicating between the abdominal cavity and the external swelling (Fig. 2). The contents of the hernial sac consisted of strangulated loop of jejunum measuring 9 cm in length and about 1cm in diameter. The portions of the intestines in the abdominal cavity not protruding into the hernial ring were of normal color and contour but the portion inside the hernial ring was blanched and bluish pink to purplish in color. The blood supply to the strangulated loop of jejunum was compromised, setting up a cascade of events starting from toxemia and ending in death of the animal. The strangulated loop of jejunum was taken out and spread out completely to observe the changes in its contour (Fig 3). There were no appreciable necropsy findings in other organs which could justify the nature of sudden death.

Fig. 2. *Hernial opening communicating between abdominal cavity and external swelling*

Fig. 3. *Necrosed intestinal loop after being taken out from hernial sac and spread out*

Discussion & Conclusion

Umbilical hernia in an adult rabbit is a rare finding. The condition is either diagnosed (Ronald and Barbara, 2008) and surgically corrected early in the life (Dehury *et al.*, 2017), or the animal altogether dies at an early age. However in the present case the doe was neither diagnosed at the time of shearing nor at the time of kindling. It appears that the condition was tolerated by the animal for a long time but due to some disturbance the intestinal loop suffered strangulation and subsequently necrosis, hence leading to sudden death of the animal.

This case study represents the initial documentation of an umbilical hernia in a rabbit from Kashmir. The study emphasizes the

necessity for meticulous screening of young and sheared animals for any inborn or acquired anomalies to minimize animal suffering and monetary setbacks.

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Non Surgical Management of Uterine Torsion in Crossbred Holstein Friesian Cow- Case Report

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Abstract

A 4-year old crossbred Holstein Friesian cow presented with signs of labour and intermittent colic was diagnosed with post cervical left-sided uterine torsion. The animal had completed term and had a prior history of normal gestation and uncomplicated parturition. Sharma's modified Schaffer's rolling technique was used to detorse the uterine torsion. After two maneuvers, the full correction of uterine torsion was achieved, and cervical dilation was facilitated with medication. Assisted delivery of a live male fetus was achieved after four hours from the procedure.

Introduction

Torsion of the uterus is a major reproductive complication in dairy cattle and presents a veterinary emergency in most of the cases which in-turn pose a serious challenge for farmers as well as veterinary professionals especially in field conditions. Amongst cattle the cases of uterine torsion have a higher incidence in pluriparous cows as compared to heifers/primiparous cows (Aubry *et al.*, 2008) and when compared amongst breeds, Brown Swiss and Holstein Friesian have higher incidence rate (Erteld *et al.*, 2012). The common aetiology has been uterine instability during advanced gestation, which results in improper extension of broad ligaments (Lyons *et al.*, 2013). Correction of torsion is vital for successful parturition, as failure to do so can result in fatal circulatory disturbances for both the fetus and cow (Frazer *et al.*, 1996). Early diagnosis and proper management are critical to prevent this outcome. According to research, Sharma's modified Shaffer's technique has been shown to be very effective in non-surgically correcting the condition in new cases (Deka *et al.*, 2022).

Case history & clinical findings

A second-parity CBHF cow, aged four years, exhibited signs of labor and intermittent colic for approximately 3-4 hours upon presentation. The cow had reached full gestation and had previously experienced a normal gestation and uncomplicated parturition. On general examination, the animal was alert and standing with intermittent straining. Per vaginal examination of the animal revealed post cervical left-sided uterine torsion (anti-clock wise) of about 180 degree. Per rectal examination revealed stretching of broad ligaments and absence of oedema and adhesions. It was diagnosed as a recent case of uterine torsion having fully relaxed sacrosciatic ligaments and engorged udder.

Treatment

After analysing the stability of vitals, the case was prepared for detorsion by Sharma's modified Schaffer's rolling technique (Deka *et al.*, 2022) was employed. The animal was restrained in left lateral recumbency and a wooden plank (70" length X 6" width) was placed on the cow's flank region across the abdomen after palpating the uterus, with one end of the plank resting on the ground (Fig. 1).With weight of an assistant around 60 Kgs on plank, cow was turned by pulling the legs tied by ropes and rolled on its back in anticlockwise direction (towards left). Subsequent per vaginal examination (Fig. 2) revealed more than 50% correction. So in order to achieve complete detorsion, the cow was restrained again in left lateral recumbency and the procedure was repeated. After two manoeuvres, full correction of uterine torsion was achieved which was appreciated both on per rectal and per vaginal examination.

Fig. 1. *Detorsion achieved by Schaffers method*

Further during per vaginal examination, the cervix was approachable, soft but not yet fully dilated for calving. In order to achieve cervical dilatation Inj Valathamate Bromide @ 2 ml via intramuscular route was administered and with every follow up P/V exam injection was repeated after hourly interval. After four hours from the procedure, the cervix was open and assisted delivery of live male foetus was achieved.

Fig. 2. *Assessing the detorsion achieved by per-vaginal examination*

Discussion

Uterine torsion is predominantly a complication of first and second stage labour, therefore, the symptoms of torsion can be observed only in animals that are due for parturition. It has been observed that cases of torsion diagnosed early can be detorsion and delivery of the foetus can be achieved but in delayed cases in which adhesion have developed detorsion cannot be achieved by this technique and caesarean section is the only recommended approach. The success of detorsion depends on the degree of torsion (severity of case) and duration of the case. This case report brings forward practice which can have promising results in successful management of uterine torsion in field conditions.

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